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FM 7-24

WAR DEPARTMENT FIELD MANUAL

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COMMUNICATION IN THE INFANTRY DIVISION

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WAR DEPARTMENT • DECEMBER 1944

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FM 7–24

This manual supersedes FM 11–10, 6 October 1941, including C 1, 23 January 1942, and C 2, 13 October 1942; section IV, chapter 1, and chapter 3, FM 7–25, 7 October 1942.

COMMUNICATION IN THE INFANTRY DIVISION

WAR DEPARTMENT • *DECEMBER 1944*

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BY ORDER OF THE SECRETARY OF WAR:

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For explanation of symbols, see FM 21–6.

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CHAPTER 1

THE INFANTRY DIVISION

SECTION I. GENERAL

1. PURPOSE. The purpose of this manual is to provide suitable plans for the tactical employment of the signal and communication personnel and equipment found in the Infantry Division, in order that:

a. Signal and communication officers and noncommissioned officers will have a check list or guide in the employment and training of their personnel, and

b. All personnel in the division, especially commanders and staffs, may obtain a more definite concept of the capabilities and limitations of all communication agencies and means, and how certain of these supplement each other.

2. PERSONNEL. Individuals (officers, warrant officers and enlisted men), whose primary duty is that of providing communication, comprise approximately one-tenth of all personnel in the division. These personnel range from division signal officer to radio operators and messengers in smaller organizations. In addition to these there are others whose communication duties are only secondary. The latter include truck drivers, intelligence personnel, reconnaissance personnel and buglers.

3. ORGANIZATION OF TEAMS. a. Limitations. In operations the available personnel and equipment should be so organized into teams as to meet the needs of the situation. Since both Tables of Organization and Tables of Equipment are changed frequently the organization of

teams, as listed in this manual, should be considered as a guide only.

b. Considerations. The following consideration should be taken into account in forming teams:

(1) The task to be performed,

(2) Availability of personnel, including specialists,

(3) Availability of essential equipment,

(4) Availability of transportation for personnel and equipment.

(5) Provisions for continuous 24-hour operation.

c. Multiple specialties. The training of personnel in more than one specialty increases team proficiency and provides optimum operation and maintenance of all agencies.

4. EQUIPMENT, SUPPLIES AND TRANSPORTATION. Current tables of organization and tables of equipment list the major items of signal equipment. Expendable supplies are listed in Army Service Forces Signal Supply Catalog, SIG 4–1.

5. REFERENCES. See FM 21–6, List of Publications for Training; FM 21–7, List of Training Films, Film Strips, and Film Bulletins; and FM 21–8, Military Training Aids.

Section II. COMMUNICATION ACTIVITIES AND RESPONSIBILITIES

6. SIGNAL ACTIVITIES WITHIN THE INFANTRY DIVISION. Signal activities performed within the infantry division are divided into five categories: training, photography, signal intelligence, signal supply (including repair and maintenance), and signal communication (sometimes termed "communication").

a. Detailed information concerning the **technical training** of communication personnel and the responsibility therefor is contained in TM 11–450. (par. 7 below).

b. Photographic activities are described in FM 11–5. Photographic personnel are not included in the infantry division but may be attached by higher headquarters to

perform certain photographic missions in the division. (See FM 11–20).

c. Personnel for the performance of **signal intelligence activities** are not organic to the division. All signal and communication troops within the division should be trained to recognize and to forward for evaluation any information that may be of material value to the signal intelligence effort. For detailed information concerning signal intelligence operations see FM 11–35.

d. **Signal supply activities** are covered in the various chapters of this manual. General supply procedures are covered in FM 100–10. (Paragraph 7b (1) (*e*) below).

e. **Signal communication activities** within the division are performed by personnel of the division signal company and by communication troops of various arms.

7. **RESPONSIBILITIES. a. Commanders.** The responsibility for communication is a function of command. (FM 100–5).

b. Division signal officer. (1) The division signal officer (DSigO), as a member of the division special staff, is the technical adviser to the division commander and interested staff members on all matters pertaining to communication activities within the division. Additional duties of the division signal officer, normally directed by the division commander, include:

(*a*) Coordinating all communication activities in the division.

(*b*) Supervising the technical training of all communication troops within the division.

(*c*) Directing the technical training and tactical employment of the division signal company and all attached signal troops.

(*d*) Conducting division communication schools. These include enlisted men's radio school; staff and commander's schools in communication application and appreciation, voice radio and telephone procedure.

(*e*) Supervising and coordinating division signal supply. Units of the division forward requisitions for signal sup-

plies to the division signal officer who in turn forwards them to the army signal officer. When these supplies are ready to be drawn, the division signal officer will notify the requisitioning unit concerning the time and place for drawing these supplies. Whenever unit transportation is not available to collect these supplies the division signal officer will arrange for such transportation either in the signal company or with the assistant chief of staff, G-4. Where necessary the army will be requested to relocate their signal supply depot at a point closer to the requisitioning units. Although the division does not establish a signal supply dump a small quantity of signal items, such as wire, may be stocked by the division to meet contemplated future operations. Such items are arranged for by the division signal officer.

(*f*) Controlling communication security within the division in conjunction with the assistant chief of staff, G-2. This includes the handling of dummy radio traffic, as well as other signal security measures.

(*g*) Preparing paragraph 5 of the division field order, the communication section of the division standing operating procedure (SOP), and the division signal operation instructions (SOI) (par. 8 below).

(*h*) Preparing plans for rotation of signal and communication officers so that each will be able to train with other types of units within the division.

(2) In carrying out these duties the division signal officer is assisted by an officer, a warrant officer, and several enlisted men. All are in the division signal officer's section of the signal company.

c. **Communication officer.** Each communication officer (ComO) has duties and responsibilities in his own unit generally similar to those of the division signal officer. These are covered in chapters 3 to 6 respectively.

8. TYPES OF SIGNAL ORDERS AND INSTRUCTIONS. a. Standing operating procedure. The standing operating procedure (SOP) for any military unit is a set of uniform standardized procedures and techniques established by the commander as a guide for the performance

of all contemplated operations that can be standardized without the loss of effectiveness. The signal communication portion of the division SOP will be prepared by the division signal officer and submitted for approval. The communication SOP for any of the other units in the division is prepared by the proper communication officer for approval by his unit commander. It should conform to the division SOP.

b. Signal operation instructions. Signal operation instructions (SOI) are a type of combat order issued for the technical control and coordination of signal and communication agencies of a command. The SOI of the division are prepared by the division signal officer for all units in the division. They conform to the SOI of the next superior unit. Units smaller than the division have little occasion to prepare their own SOI as they need only extract pertinent parts of the division SOI. (See FM 24–5, or FM 24–16 (when published).) Brevity codes (nonsecurity codes), map coordinate codes, and prearranged message codes may be prepared by units smaller than the division.

c. Command posts and axes of signal communication. (1) The division signal officer is responsible for advising the division commander concerning the location of the command posts and the axes of signal communication for each of the next subordinate units of the division. He must be prepared also to recommend the location of the division command post in case higher headquarters fails to direct its location. The duties of each of the various communication officers are similar for his own unit and its immediate subordinate units.

(2) Whenever practicable regimental and higher unit commanders should designate the initial command post of their next subordinate units in order to facilitate early establishment of the communication system, thereby enhancing control.

(3) The following factors should be considered in the selection of any command post:

(*a*) Type of operation,

(*b*) The disposition of subordinate units in the plan of operation,

(*c*) The signal communication requirements,

(*d*) Existing road nets and traffic conditions,

(*e*) Possible routes for wire lines including existing wire lines,

(*f*) The space needed for staff activity,

(*g*) Terrain characteristics favorable to defilade and concealment.

(4) The general location is designated by some convenient landmark, such as a road junction or a stream crossing, easily identified on the map and on the ground. The exact site is selected by the commander concerned or by a member of his staff. It should be close enough to the designated landmark to be readily located, but at least 200 yards therefrom if the landmark is likely to attract hostile artillery fire or air attack. Signs marking the location of the command post and the routes thereto are used sparingly. They should be large enough to be read from a rapidly moving vehicle. When the danger is great, signs and markers are not used. When signs are not used, guides are posted to direct authorized personnel to the command post and messengers are given more precise instructions than ordinarily.

(5) The axes of signal communication are designated in paragraph 5 of the field order by:

(*a*) Designating successive probable locations of the command posts. (All designated points need not be occupied but the command post will be along the general route established by these points). (See FM 24–5).

(*b*) Designating a definite route along which sites will be selected and reported. (This is usually done in rapidly moving situations only).

(*c*) Directing that sites be selected and reported within the zone of action. (This is done in terrain that lacks definite, easily recognized, terrain features).

CHAPTER 2

DIVISION SIGNAL COMPANY

Section I. COMMAND AND ORGANIZATION

9. GENERAL. The signal company is an organic part of an infantry division, and performs all signal activities for which the signal corps is properly responsible within the division. Normally, the numerical designation of the signal company is the same as that of the infantry division to which it is organic. In certain divisions only the last two digits are the same.

10. EQUIPMENT, SUPPLIES, AND TRANSPORTATION. In addition to individual equipment issued to personnel, the signal company is authorized signal equipment, supplies, and motor transportation in sufficient quantities to permit it to accomplish all normal missions. Additional equipment and material may be obtained upon authorization from higher authority when the company is assigned special missions requiring more than the authorized allowances.

11. ORGANIZATION. a. General. The organization of the signal company, infantry division, is prescribed in Tables of Organization and Equipment, T/O & E 11–7 (fig. 1). The details of organization set forth in paragraphs 12–14 are in accordance with the present T/O & E dated 11 December 1943, change 1 dated 25 March 1944, and change 2 dated 16 July 1944.

b. Administrative. T/O 11–7 subdivides the signal company into platoons and the platoons into sections. The

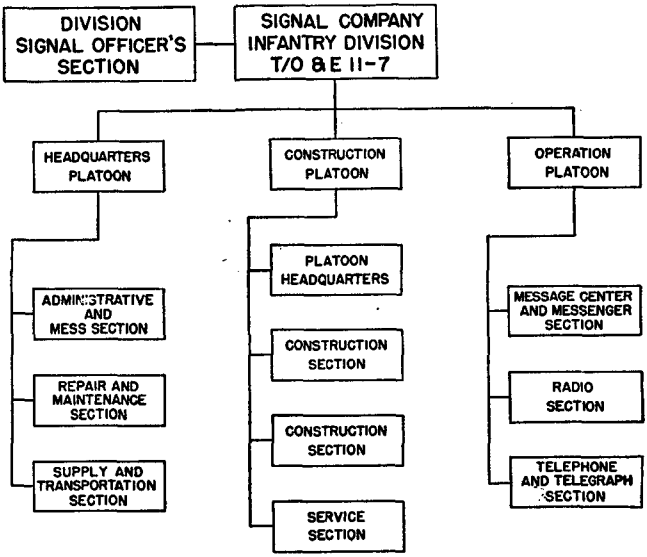


Figure 1. Organization of the division signal company.

platoon seldom operates as a unit, but the organization is satisfactory for administrative control.

c. **Functional.** For field operations, the signal company is organized into working teams. To maintain 24-hour service, each team is divided into reliefs. The composition of these teams is not prescribed by Tables of Organization, and will vary in different organizations. Varying tactical conditions will cause modification of the number and composition of the various teams and reliefs suggested. These teams normally are consolidated into two groups, a *command post group* and a *rear echelon group.* The company commander and his platoon leaders must coordinate their efforts to develop working groups which will respond quickly and efficiently to changing situations. Flexibility of organization must be stressed throughout the training phase, so that the unit may function effectively in field operations.

(1) The command post group is organized so that an *advance party* (to perform signal communication duties just prior to and during displacement of the command post) can be detached from the command post group without seriously hampering the performance of normal signal functions at the existing command post. That portion of the command post group which continues to function at the existing command post is known as the *command post team.* Hence, the term *command post team* is used throughout this chapter to designate the command post group less the advance party and any other detachments (from the command post group) which are working at locations other than the division command post.

(2) The rear echelon group is smaller than the command post group and is usually operated as a single team. It is divided into reliefs to allow continuous 24-hour service. When a move is contemplated an advance party may be formed although the entire rear echelon usually moves as a single serial.

12. **HEADQUARTERS PLATOON. a. General.** The headquarters platoon normally is divided into three sections—administrative and mess section, repair and maintenance section, and supply and transportation section.

b. Administrative and mess section. The administrative and mess section comprises the company headquarters for administering and messing the company. Normally the section is employed at the company bivouac. The company commander commands this section assisted by the first sergeant.

c. Repair and maintenance section. This section operates under the direction of the company supply officer with technical supervision by the company radio officer and company telephone and telegraph officer. It performs third echelon maintenance of the radio, telephone, telegraph, and teletypewriter equipment for all units within the division, and second echelon maintenance of all communication equipment in the signal company. It also may perform third echelon maintenance of abandoned or captured signal equipment that has been recovered by the division. Two mobile

repair trucks are furnished normally for the use of the section. These trucks are located in the division service area (par. 15d) and equipment to be repaired is brought there. In emergencies, qualified specialists from this section travel to the site of the faulty equipment to perform minor "on the spot" repairs. Whenever possible, the replacement method of repair is utilized, because this involves the minimum delay in restoring equipment to service. Faulty components are repaired and placed in stock for future use. During periods in rest areas the repair section may be augmented by mobile teams from a signal repair company.

d. Supply and transportation section. This section comprises the company supply officer and enlisted personnel necessary for company supply, and the company motor warrant officer and enlisted personnel needed for second echelon motor maintenance for operation and maintenance of the company motor pool and for second echelon maintenance of gasoline driven power units. This section performs all duties pertaining to company supply and transportation. Personnel of this section may be employed to assist the division signal officer in the handling of division signal supplies when necessary.

13. CONSTRUCTION PLATOON. a. General. This platoon, commanded by the construction officer, usually comprises a platoon headquarters, two construction sections, and a service section. It is responsible for the planning, installation, maintenance and recovery of all trunk circuits required by the division or ordered by higher headquarters, and may assist the telephone and telegraph section in the installation and recovery of long local circuits.

b. Construction section. Each section contains sufficient personnel to form at least two construction teams or wire teams. These teams are the working units which construct or recover wire lines. The type and extent of construction required on a particular line will determine the size of the team. The company commander divides the sections into the smallest practicable teams consistent with the available personnel and equipment. These teams are used for small jobs, but may be combined for

larger projects. Each team normally has at least one large truck equipment with a wire-laying reel unit and wire construction equipment, and one small truck for carrying personnel who "police" the line, make overhead crossings and perform routine maintenance. For cross-country wire laying, the jobs assigned the trucks are reversed. Additional wire is carried on the large truck.

c. Service section. This section transports wire, poles, and all other material needed for wire line construction, and services field wire that has been recovered but was not serviced as recovered. The personnel and equipment of this section are used to augment the construction teams when the situation so requires.

14. OPERATION PLATOON. a. General. This platoon is divided into three sections: message center and messenger section, radio section, and telephone and telegraph section. These sections operate all means of signal communication at all echelons of division headquarters, and at all other points where signal communication facilities are required.

b. Message center and messenger section. This section comprises two officers, two warrant officers and enlisted personnel to provide continuous message center service for division headquarters. The section is divided into teams, one of which operates with the division command post group, and the other with the rear echelon group. If it becomes necessary to establish an advance message center or to displace the command post, the message center and messenger team assigned to the command post group must be divided into two teams, one of which remains with the command post team while the other works with the advance party. Each team of the message center and messenger section should be divided into reliefs in order to prevent undue hardship to personnel, and yet maintain continuous service. For a detailed description of message center procedure and messenger service, and the factors governing the selection of a suitable message center site, see FM 24–5 (or FM 24–17 when published).

c. **Radio section.** The radio section comprises an officer in charge (who may be designated as division radio officer) and enlisted personnel to install, operate, and maintain all radio communication facilities at all echelons of division headquarters. The section is divided into a suitable number of teams, depending upon the number and type of radio sets and the operating personnel available. The section furnishes radio teams (with sets from the division signal company) to accompany elements of the division on the march, or elsewhere as needed, to provide radio communication in normally established or special radio nets. If possible, at least one team with suitable equipment and operating personnel should be kept in reserve (normally at the command post) for special missions. Those teams operating in nets where continuous service must be maintained should be large enough to provide reliefs. All operators should be trained in the operation of all types of sets used by the section. Such multiple training permits the shifting of operators from one team to another when necessary, but personnel assigned to a certain team normally should remain with that team except in emergencies. Suitable radio teams to provide adequate radio communication for the operations being conducted by the division are assigned to the command post group and to the rear echelon group as a matter of routine. When an advance message center is established or the command post is displaced, the teams with the command post group are split between the command post and the new location, in the proportions necessary to provide radio communication at both places.

d. **Telephone and telegraph section.** This section comprises an officer in charge (sometimes designated as division wire officer), and enlisted personnel to install, operate and maintain the wire system installations located at all echelons of division headquarters and at switching centrals installed as part of the division wire system. This includes installation and maintenance of local circuits and short trunk circuits. If necessary, the construction platoon may assist this section in the installation of long local circuits. The section in turn assists the construction platoon in the maintenance of all wire circuits installed. (See par.

13.) The section is divided into teams, each team containing the necessary personnel for the installation, operation, and maintenance of telephone, telegraph, and teletypewriter equipment required at each echelon of division headquarters. The teams are divided into reliefs to provide continuous service, when needed. When the command post is displaced or an advance message center is established, the team with command post group is normally divided between that group and the advance party.

15. ORGANIZATION FOR COMBAT. a. General. As noted above, the division signal company is divided normally into a command post group and a rear echelon group each capable of providing adequate signal communication for the corresponding echelon of division headquarters. The command post group is usually larger than the rear echelon group, since it must be more flexible in order to meet the signal communication requirements of changing tactical conditions. It must include sufficient personnel to install, operate, and maintain signal communication facilities at a new command post location, at advance message center(s) as required, and for other similar purposes without adversely affecting signal communication at the existing command post.

b. Command post group. An advance party must be detailed from the command post group to install, operate, and maintain suitable signal communication facilities at a new location. This party consists of the minimum personnel required for the mission. To provide continuous communication during the displacement of the command post, the advance party establishes the necessary signal communication facilities at the new location, before the command post moves. The old command post closes when the new command post opens. The remainder of the command post group recovers the signal equipment at the old command post location and rejoins the advance party to aid in the expansion of the installation, and in the operation of established facilities. Should it become necessary to establish an advance message center and a new command

post simultaneously at different locations, further subdivision of the command post group will be necessary.

c. **Rear echelon group.** The rear echelon group consists of the minimum personnel needed to provide signal communication for the rear echelon of division headquarters when this echelon is not located with the command post proper. The rear echelon is displaced, when necessary, in a manner similar to that described above for the command post. If the rear echelon is to move to an old command post location, the rear echelon group shall take over some of the established facilities.

d. **Administrative.** Normally the company bivouac will be near the forward echelon of division headquarters. It should always be located so that reserve operating and construction teams will be available for possible special missions with the least delay. A detachment of the company will bivouac with the rear echelon. The repair and maintenance section will be located in the division service area. Probable locations include the ordnance repair establishment, army signal depot, division rear echelon or the signal company bivouac.

16. **TRAFFIC PRIORITY.** Vehicles of the signal company engaged in the actual installation, operation, and maintenance of the signal system, and all vehicles carrying messengers, are given a high priority on all roads. Care should be taken to insure that maintenance vehicles do not block roads unnecessarily. All other signal company vehicles, including those carrying routine supplies, have no special traffic priority.

17. **MOTOR TRANSPORTATION.** The proper operation, inspection, and maintenance of signal company motor vehicles are of the utmost importance. The regulations set forth in FM 25–10, and any amplification thereof by division headquarters must be followed strictly.

18. **STANDING OPERATING PROCEDURE.** The signal company SOP will be prepared by the signal company commander. Since many signal company operations

vary little with the type of tactical operation in which the division is engaged, the advantages of a well-established, comprehensive SOP for the signal company are obvious. The scope of the SOP depends upon the state of training of the company, available signal equipment and supplies, terrain characteristics and other features of the area in which the division is engaged, and similar factors anticipated for future tactical operations. When the tactical situation so requires the division signal officer orders the necessary deviation from SOP to provide adequate service for particular tactical operations, or for unusual signal communication requirements not covered in the SOP.

Section II. COMMUNICATION DURING A CONCENTRATON

19. **DEFINITION.** *A strategic concentration* is the movement and assembly of designated forces into areas from which it is intended that operations of the assembled force shall begin. An infantry division may be concentrated as an independent unit or as a part of a larger force. For details of the various factors which influence the selection of concentration areas and operations which involve signal communication therein, see FM 100–15.

20. **ACTIONS INVOLVED.** The following actions normally characteristic of the concentration of an infantry division are of interest to the division signal officer since they provide information useful in the formulation of plans for signal communication. (See FM 100–15).

a. A concentration area is designated by higher authority, or selected by the division commander.

b. Reconnaissance of the area is made.

c. Security forces are sent to the concentration area.

d. The elements of the division are arranged into suitable groups and moved to the concentration area by rail, motor, marching, water, or a combination thereof.

e. Commanders usually arrive with the leading elements of their commands.

f. Planning, training, supply, and evacuation are continuous from the arrival of the first elements until the area is vacated.

21. PLANNING FOR COMMUNICATION. During the planning for a concentration, the signal officer is responsible for actions to insure adequate signal communication. These actions will, in general, include the following:

a. Conducting a thorough signal reconnaissance to obtain detailed information concerning existing signal facilities in the concentration area. This reconnaissance should include the tentative selection of command post sites, location of suitable messenger routes, and arrangements for use of existing commercial communication facilities in the area.

b. Preparing a signal plan for the movement into the concentration area and for the period of the concentration. This will include use of wire systems, arrangements for telephone stations along march routes, and messenger service. Radio operation is restricted or prohibited during this period.

c. Making provision for signal company teams to accompany initial elements of the division into the concentration area.

d. Arranging for communication details of subordinate units to accompany the leading elements of their respective units.

e. Preparing recommendations for the establishment of the headquarters of all units at locations which facilitate signal communication.

f. Taking suitable steps for the adoption and maintenance of signal security measures.

22. COMMUNICATION ACTIVITIES DURING CONCENTRATION. a. General. During the concentration period the signal officer and the signal company, normally will be engaged in training, signal supply, and

other signal communication activities. The extent to which these several activities are carried on depends on the status of training, adequacy of equipment, number and capabilities of personnel, and any factors peculiar to the contemplated operation. The more important tasks associated with the various activities are listed in the following subparagraphs. Photography is not normal during the concentration period, but such photographic activity may be conducted as the personnel allotted by higher headquarters permits.

b. Training. (1) Revising of existing SOP or preparing of new SOP to meet requirements of anticipated operations, and thorough training of all personnel in all modified or new techniques.

(2) Instructing personnel concerned in the installation, operation, and maintenance of new or special equipment provided for the operations.

(3) Training in the protection of military information, and the observing of all signal security procedures.

(4) Studying of enemy characteristics and adopting of special precautions for the successful performance of all missions incident to the planned operation.

c. Signal intelligence. (1) Formulating of specific signal security measures for the anticipated operation, in addition to all normal security methods (modified if necessary).

(2) Establishing liaison with the signal intelligence service of higher headquarters, and setting up channels through which all information useful to the signal intelligence effort may flow.

d. Signal supply. (1) Insuring technical inspection of all signal equipment on hand in the company to check its operating condition and adequacy.

(2) Replenishing of shortages and replacement of unserviceable items.

(3) Establishing liaison with the signal supply source and initiating action for the procurement of signal equipment and supplies for future operations.

e. Signal communication. (1) Making a detailed reconnaissance in order to plan the signal communication

system for anticipated operations in such a way that it can be modified easily to meet future requirements.

(2) Installing, operating, and maintaining the signal system.

(3) Preparing of SOI for the operations (in agreement with SOI of higher headquarters).

(4) Drafting plans for future operations and making preliminary provisions for the execution of such plans.

23. COMMUNICATION DURING CONCENTRATION. a. General. The division commander may require signal communication from the command post in the concentration area, to detraining and detrucking points, to division security and reconnaissance forces, to the division rear echelon, to headquarters of subordinate units, and to division supply and evacuation establishments within the division area. Priority for the establishment of service to these units and installations should be specified. (See fig. 2.)

b. Message center. A message center will be operated at both the command post and the rear echelon (if the latter is separate from the command post). It also may be desirable to establish one at entraining and detraining points, to be operated like an advance message center.

c. Messengers. Messengers must be available at each message center established. Special msesenger service is provided as required. The signal officer determines whether the volume of message traffic and the location of message centers serving the division and subordinate elements warrant the establishment of scheduled messenger service.

d. Radio. All radio stations in the concentration area are silenced when secrecy and surprise are essential to the success of the concentration, except that limited use may be necessary for warning and for reconnaissance forces in contact with the enemy. Other means of communication having greater security are used.

e. Wire. Wire installations within the concentration area are held to a minimum, even in the absence of adequate commercial wire facilities, unless it is anticipated that the

division rear echelon will remain established in the area after the start of operations. (See figs. 2 and 3.)

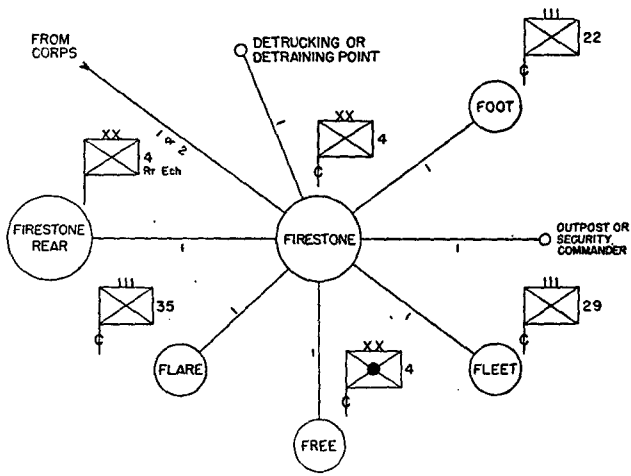


Figure 2. Trunk lines and long locals normally laid during concentration. Lines may be laid to other units if time permits and the distance is not too great.

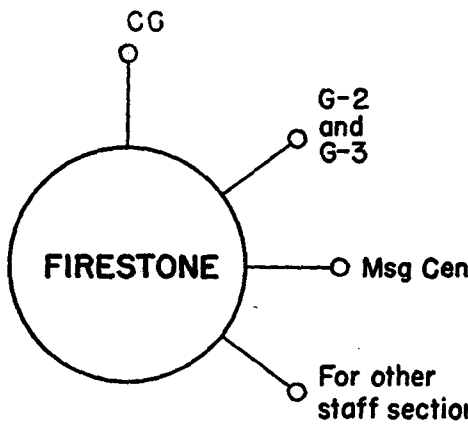


Figure 3. Schematic diagram showing minimum locals needed during a concentration.

Section III. COMMUNICATION DURING MARCHES AND AT HALTS

24. GENERAL. Marches by an infantry division may be made in one or more stages; they may be made in one or more columns, moving on one or more routes; and they may be accomplished by a combination of marching and motor transport, or by a complete motor movement. For any march movement, adequate signal communication by which to exercise control of the moving columns is essential. The division signal officer obtains early information of the march plan and issues warning orders so that the signal company may have adequate time to provide the required signal facilities.

25. MOVEMENT OF THE SIGNAL COMPANY. The movement of the signal company is influenced by the location from which the division commander exercises command and control of the moving columns.

a. When the division commander remains at the command post in the concentration area or old bivouac area and plans to move to a forward location to be secured by advanced elements, the advance party of the command post group may accompany the marching columns, or may move subsequent to the start of the march. This party moves directly to the designated location of the new command post, and arrives there in time to complete the signal installation by the hour the establishment is scheduled to open. The command post team (par. 11c) or the rear echelon group, continues operation of signal facilities at the old command post. If the command post team continues the operation, it closes at the old location and moves to the new location when notified that the advance party has established and is operating the signal system at the new command post. The rear echelon group, if so directed, continues operation of signal facilities at the old location for the division rear echelon or other division personnel.

b. When the division commander, accompanied by elements of the division, moves with one of the marching columns, the command post group of the signal company

ordinarily accompanies the marching columns. The advance party marches in the same column with, and in close proximity to, the division commander. The command post team (par. 11c) may be placed in any position in any column, but its arrival at the new command post must not be unduly delayed. The movement of the rear echelon group will be governed by the movement of the division rear echelon.

c. Additional command agencies (such as advance message centers and control points) may be established at successive locations along the route of march. In such cases, teams from the command post groups are designated to establish the signal communication for these additional command establishments. When a march is made in more than one column, control of these columns is essential. Frequently radio and wire construction teams are attached to each column to facilitate communication on the march and to expedite the establishment of communication upon completion of the march.

26. MOTOR MOVEMENT BY SHUTTLING. The methods outlined in paragraph 25 are, in general, applicable to movements of the division when shuttling with its organic transportation. The size of the advance party of the command post group (moving on the first shuttle) is determined by the extent of the signal system to be installed upon completion of the march, the time available for its installation, and the time required to bring up the command post team. It is seldom feasible to use the vehicles of the operation and construction platoons for shuttling personnel or equipment. These vehicles will, in general, be required for signal communication tasks incidental to the movement and to subsequent operations. Standing operating procedures should prescribe the normal manner of employment of the signal company during shuttling operations.

27. COMMUNICATION WHILE COLUMNS ARE FORMING. Maintenance of adequate signal communication is critical during the time between the closing of command posts of subordinate units and the arrival of

subordinate commanders at the heads of march columns. When the division command post is to remain in the area, wire lines may be installed from the command post to initial or critical points on the initial line. These, supplemented by special messengers, usually will be sufficient. When time does not permit the installation of wire circuits, or when the division command post will not remain in the area long enough to permit recovery of installed wire circuits, signal communication between the command post and initial points may be provided by using radio and messengers. Signal communication from the division command post to the command posts of the next subordinate units, while these are moving to their march positions, may also be carried on by radio and special messengers. Radio teams of the signal company may be attached to subordinate commanders to provide radio communication. Radio also may be used advantageously to provide signal communication between staff officers engaged in supervising the organization of march columns, especially in situations where the different units comprising the column are widely separated.

28. COMMUNICATION DURING THE MARCH. **a. General.** Signal communication normally is provided from the division command post to reconnaissance and security elements operating under division control, to command posts of column commanders, to advance message centers, to control points, and to the rear echelon when established. Warning nets may be provided to warn of air or tank attacks. Signal communication within the various reconnaissance and security elements of any column is a responsibility of the column commander concerned.

b. Message centers. Message centers are established at the division command post, at the rear echelon, and at such control points and advanced locations as may be designated under the march plan. When the division commander elects to accompany the division on the march, message center operations usually are conducted in a vehicle moving with the march command post. A message center team of two reliefs is provided for each control group, to permit ad-

vancing by bounds. When an advance message center is to be employed, the assignment of a team comprising only one relief generally is sufficient.

c. Messengers. The number of messengers and the type of service provided at each message center will vary with the size of the echelon served. Motor messengers are indispensable at the message center of the march command post. At least one messenger vehicle is detailed to follow the division commander's vehicle. Similarly, messengers may be detailed to follow in the rear of designated staff vehicles, in the rear of the message center vehicle, and in the rear of operating radio stations. Scheduled messenger service seldom is practicable during the march, except for service between the command post and rear echelon. Whenever possible messengers not required for march service should be supplied with transportation and encouraged to rest, so that they may relieve messengers at the end of the march. Messengers should have had training in march operations, including the passing of messages between vehicles with an improvised message stick, and the use of prearranged signals to call messengers to vehicles.

d. Pigeons. If pigeons are provided they should be distributed to reconnaissance and security elements, and to communication personnel serving column commanders, before the start of the march. When pigeons are used, arrangements are made for the relay of messages from the loft to the march command post. (See FM 11–80 for additional information on pigeons.)

e. Radio. (1) *Factors involved.* Employment of radio communication during the march is based on the following factors:

(*a*) Importance of security and surprise.

(*b*) Rapidity of maneuver.

(*c*) Necessity of immediate warning of air or tank attack.

(*d*) Necessity of rapid communication from and within any unit coming into contact with the enemy.

(2) *Command net.* The command net generally includes stations at the division command post, at each column

march command posts, and, on occasion, at control points and the advanced message center (s). (See fig. 4.) Radio teams from the signal company may be attached to each

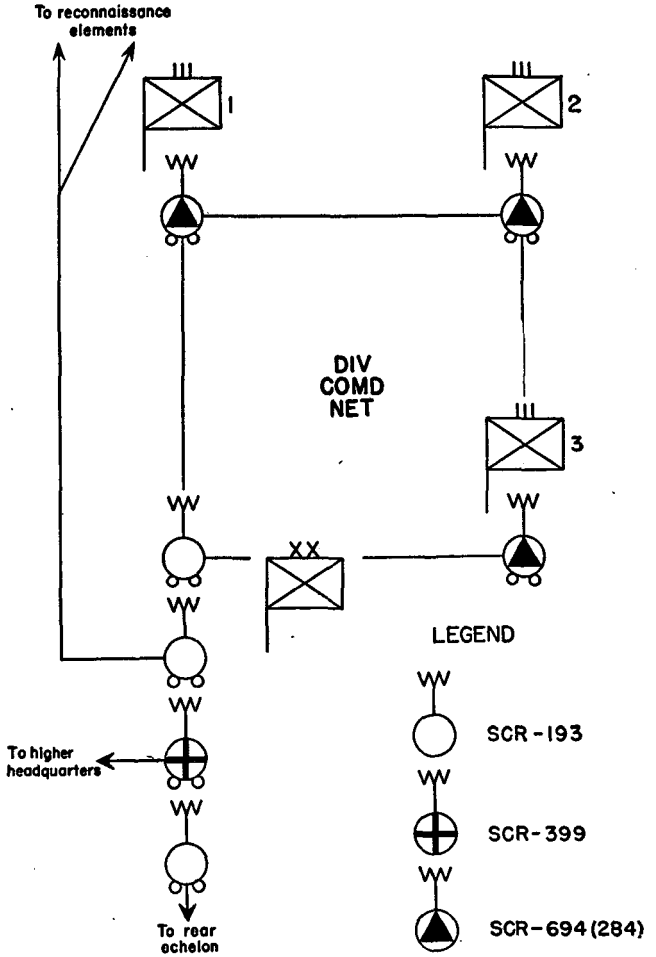


Figure 4. Radio nets for an infantry division moving in two columns.

column. If it is necessary for any radio to halt out of column in order to operate, a prearranged schedule with that radio must be established. The command post station should also maintain constant watch on the assigned frequency so that the march column may be able to contact division headquarters at any time. The command net may be silenced upon the installation of an adequate wire net in the new bivouac area.

(3) *Reconnaissance net.* The division reconnaissance net includes stations at the command post, with the reconnaissance and security elements under division control, and in airplanes observing for the division. Stations of the signal company may be attached to these elements. Operations of the net usually is continuous, with stations silenced only when maintenance of absolute security is essential.

(4) *Warning net.* Generally the operation of a separate warning net is not desirable because it is not economical of radio sets and operators. If such a net is operated, the net frequency is selected to permit as many units as possible to listen. Transmissions in this net are restricted to warning signals.

f. **Visual.** (1) *General.* Panels and pyrotechnics including colored smoke are the principal means of visual communication used during the march. Friendly aircraft may warn marching troops of impending hostile attacks by flying over the columns and using prearranged wing signals or pyrotechnics.

(2) *Panels.* These may be used to mark the march message center vehicle in column, to identify units on call from friendly aviation, and to effect transmission of short messages. Panels may be operated by either message center or radio teams.

(3) *Pyrotechnics.* A special, prearranged pyrotechnic code may be prescribed for use on the march. If higher authority has prescribed a code, the division should request authority for assignment of desired special meanings. Lookouts must be provided to watch for pyrotechnic signals and to relay messages to message centers. Colored smokes furnish a rapid means of sending short prearranged messages to airplanes in flight.

g. Wire. (1) *Wire lines.* Full use is made of existing wire facilities in the zone of advance. When control points or advance message centers are located near commercial wire circuits, arrangements should be made to use these circuits. When columns march on roads which are paralleled by commercial wire lines, arrangements may be made to establish a signal circuit over such lines at specified times, such as during the hourly halts. Commercial circuits may be used also between the march command post and reconnaissance and security elements. Such circuits may be used by either tapping the wires at the desired points or, when the march is made in friendly territory, by arranging with the commercial company for the desired service. In order to prevent enemy interception of conversations, circuits which lead into enemy-occupied territory are interrupted at a point beyond which use of the wire by friendly forces is not expected in the near future. Such interruptions should be made in such a way as to permit easy restoration of the circuits and extension of the wire system when required. Field wire should be conserved for combat use and usually is not laid for march communication.

(2) *Teams.* When the use of wire communication is contemplated, teams from the construction platoon and the telephone and telegraph section should be attached to those elements of the division where this communication is to be employed. These teams, if augmented by security personnel, may reconnoiter existing wire communication systems in unfamiliar territory.

29. SIGNAL SUPPLY. Issue of signal supplies to all units of the division should be completed prior to the start of a march.

30. PRECAUTION FOR SECRECY ON THE MARCH AND DURING HALTS. a. General. The entire division must comply with all measures specified by the division commander to insure secrecy of movement. Operations of the signal company under these conditions require careful planning, painstaking attention to detail, and a high order of discipline.

b. During daylight hours. Parties reconnoitering routes and bivouacs, and teams constructing, repairing, or readjusting wire lines are kept to a minimum, both in numbers and in size. Vehicles used by such teams move singly. Wire construction teams make every effort to keep concealed, especially when hostile aviation is active. Parked vehicles are concealed and kept away from command posts. Strict compliance with traffic control measures is essential.

c. During hours of darkness. Exposed lights and fires are prohibited. The lights used by signal operating personnel are shielded carefully. Motor elements travel in small groups, moving intermittently for such distances as are dictated by existing road and traffic conditions.

31. HALTS DURING THE MARCH. Signal personnel should take advantage of halts to tap wire circuits, communicate with airplane observers by means of panels or drop and pick-up messages, and repair and adjust equipment.

32. HALTS AFTER COMPLETION OF A MARCH. The bivouac area of the signal company usually is selected in the vicinity of the division command post. Vehicles of the company are parked in concealed location in or near the company bivouac and in such a manner as to minimize traffic difficulties near the command post. Care must be taken especially in wet weather to provide hard standing for the heavier vehicles and to avoid traversing soft ground.

33. LOCATION OF COMMAND POSTS FOR THE HALT. a. Division. The orders directing the halt usually prescribe the location of the division command post. The division commander makes the selection when this location is not prescribed by higher authority. He may request a recommendation from the signal officer. See paragraph 8 for factors to be considered in selecting command posts. Higher headquarters and next subordinate commanders are notified promptly of the selected location.

b. Subordinate units. The signal officer must be prepared to recommend suitable locations for the command

post of each subordinate unit, and for outposts under division control. His recommended location for the command post of any subordinate unit should be within the bivouac area of that unit.

34. COMMUNICATION DURING THE HALT.

a. General. Consideration is given to the following factors in planning a signal system for the halt.

(1) Location of signal installations and elements of the signal company within the bivouac area in relation to the next operation.

(2) Amount and types of signal communication required by the division commander for the conduct of reconnaissance and security measures and for administrative functions.

(3) Desirability of providing a simple signal system which is adequate and flexible.

(4) Conservation of signal supplies in order to have sufficient quantities available for the next operation.

(5) Rest and comfort of the signal troops.

b. Message centers. The schedule for reliefs should be arranged to cover the period the command post is expected to remain in the bivouac area. Personnel not required for duty at the time should be sent to the company bivouac to rest.

c. Messengers. (1) *Local.* Local messengers should be informed of the locations of the various offices at the command post and the officers on duty at each. When a halt is made during darkness, it is desirable to have these messengers reconnoiter routes from the message center to the other installations in the vicinity. They should know the personnel scheduled to relieve them, and when and where their relief may be located in the company bivouac.

(2) *Scheduled and special.* The signal officer determines whether special or scheduled messenger service, or both, is to be provided. The duties of some messengers on the march are fatiguing, and consideration must be given to their need for rest during the halt. In general, special messengers are adequate for halts between march stages.

If the halt is of longer duration, scheduled service should be established. There are two periods during a halt when the employment of special messengers is essential; at the beginning of the occupation of the bivouac area, and at the time warning orders and other instructions relative to the next division operation are issued.

d. Pigeons. Although pigeons provide a suitable means for the rapid transmission of information from reconnaissance elements and outposts to the command post, time will seldom permit the settling of pigeons at a loft in the bivouac area. Pigeons from lofts of higher headquarters may be available. Arrangements must be made to provide for subsequent transmission of pigeon-carried messages, from the loft to the addressee. (See FM 11–5.)

e. Radio. Restrictions placed on the use of radio during a march usually are applicable during a halt. The reconnaissance net may be operated, but the command post station must be located at some distance from the command post. Stations in the command nets may be placed in a stand-by condition ready for operation, but transmissions from these stations are prohibited normally. Operation in the corps nets will be as directed by corps headquarters. Radio equipment used during the march is inspected and promptly restored to operating conditions if in need of repair or adjustment.

f. Visual. When reconnaissance aviation is working with the division during a daylight halt, a panel station should be established, *but it must not be located near the command post or bivouac area, particularly if hostile aviation is active.* The panel station, combined with the message-dropping and pick-up ground, normally is located near the command post stations of the air-ground net. Panel operators may be detailed to fire pyrotechnics and to watch for pyrotechnic signals.

g. Wire. Wire facilities installed in the bivouac area are held to the minimum required. Installations made during hours of darkness may require adjustment at dawn. When the halt is made in friendly territory and commercial wire facilities exist within the bivouac area, arrange-

ments may be made to use certain such facilities. When it is impracticable for the commercial company to operate these facilities, they may be taken over and operated by the signal company.

35. **SIGNAL SUPPLY.** Adequate signal supplies for the march should be distributed prior to the movement, if possible. If it becomes necessary to issue such supplies at halts during a march, the signal company may be designated as the signal supply distributing point.

Section IV. COMMUNICATION DURING DEVELOPMENT

36. **TACTICAL OPERATION.** During the period of development of the division, columns are breaking up into smaller groups, moving on assigned march objectives, or to assembly positions preliminary to deployment for attack or defense. The signal company must be prepared to meet the signal requirements created by the changing tactical situation.

37. **COMMAND POSTS. a. Division.** The signal officer must secure early information of the contemplated action. He must be prepared to recommend locations for the command posts of the division and of major subordinate units, and must be ready to issue warning orders to the signal company. The advance party of the command post group moves directly to the selected command post location and begins installation of the signal system in accordance with SOP or the orders of the signal officer. The command post team (par. 11c), if functioning in the old bivouac area, usually is ordered to close at the old location at the hour the command post closes and to move by a definite route to the new location, so that it will arrive at a specified time. The rear echelon may displace or remain in its established location, in conformance with the announced plan for the rear echelon.

b. Subordinate units. If the command posts of major subordinate units are to be occupied for an appreciable time, they are usually located in the respective unit assembly positions; otherwise, they are set up in the initial battle positions. In general, a command post is located well forward in a position where it will have the greatest protection against hostile ground units (including tanks), airplane and airborne attack, and where the routes to its subordinate units will facilitate installations of the wire system and expedite messenger service. As far as practicable, the command posts of major subordinate units should be accessible by two or more routes from the division command post.

38. COMMUNICATION DURING THE DEVELOPMENT. a. General. There will be no break in the operation of the signal system during development. Properly planned signal communication insures a system capable of being modified to meet the requirements of development and deployment. (See FM 100–5.)

b. Message center. The message center of the march command post may continue operation during development. If a message center is not employed on the march, one must be promptly established at the command post by a team from the advance party. If a temporary command post has been designated, it may be necessary for the command post group to establish an advance message center at the probable battle command post location.

c. Messengers. The changing locations of subordinate units in the development or deployment and the movement of several small columns on all routes will make the duties of messengers extremely difficult. All messengers must be instructed carefully about routes and the locations of the units to which they are dispatched. Scheduled messengers should be used from the command post to the rear echelon and, when subordinate unit locations become stabilized, to the headquarters of such units, if practical.

d. Radio. The extent to which radio is used is determined after the requirements for secrecy and surprise have been weighed against the need for this means of signal communication.

(1) *Command net.* Operation of the division command net may be initiated at this time, if it has not been in operation on the march. Operation of secondary stations in such nets may be limited to combat teams in contact with the enemy. A radio channel may be established between the command post and the covering force under division control. If the covering force does not have suitable radio equipment, the necessary equipment and operating personnel usually are allotted from the division signal company. Transmissions are prohibited from radio stations of units whose locations are to be concealed from the enemy. Radio transmissions of messages to silent stations may be accomplished by either the broadcast (F) or the intercept (I) method. (See FM 11–454.)

(2) *Reconnaissance net.* Usually there is no reason for curtailing radio operations in this net during the development. The commander needs this channel of communication in order to receive timely information of the enemy.

e. Visual. When there is a possibility that enemy air or ground elements may observe the signals, requirements of secrecy and surprise may make it necessary to prohibit the use of visual signals by elements not in contact with the enemy.

f. Wire. Every effort is made during the development to initiate the wire system required for combat. Installation of lines which cannot be utilized during combat are held to a minimum. In some cases, wire circuits from the division command post to the command posts of major subordinate units can be conveniently routed through the assembly command posts of these units. Such routing may be prescribed so that the wire system established for the development may be extended and utilized for succeeding operations. As soon as a construction team has completed construction of wire lines to an infantry regiment (or combat team) it is customary to have this team remain at the command post of the regiment to:

(1) Be available to maintain the wire lines to division,

(2) Be prepared to extend the division wire lines when the infantry command post moves,

(3) Be prepared to provide heavy wire to the infantry when needed.

Section V. COMMUNICATION DURING THE ATTACK

39. GENERAL. The attack in the meeting engagement demands speed in execution, the widest possible exercise of initiative by subordinate commanders, rapid orders, and prompt action. When the division attacks an organized position, a more deliberate process requiring thorough reconnaissance and a maximum of coordination among all components of the attacking forces is usually essential. The time available prior to an attack has a direct bearing on the extent of the signal system to be installed (FM 100–5).

40. TACTICAL OPERATION. Attacks are classified as *envelopments* and *penetrations*. Regardless of the tactical form of the attack, troops are distributed in two or more principal tactical groupings: one or more to make the main attack in which the greatest possible offensive power is concentrated, and one or more for the secondary attack(s) to render maximum assistance to the main attack. The signal officer and signal company are particularly concerned with the location and direction of the main attack, since this attack probably will require most of the efforts of the signal company in maintaining adequate signal communication.

41. DUTIES OF SIGNAL OFFICER. a. Signal planning. In order that signal communication may become operative without delay, the signal officer must constantly plan ahead, maintain close liaison with the staff to gain the earliest possible information of the commander's plans, and issue warning orders to the signal company as soon as possible. A careful study is made of the terrain with regard to command post locations, axes of signal communication, and protected routes for wire lines and messengers. He

makes such signal reconnaissance as time and the enemy situation permit to select suitable command post locations, which he will recommend for major subordinate units and also for the division, when the latter is not prescribed by higher authority. The details of plans and the extent of signal installations normally will be governed by time available for detailed planning prior to the attack. It is essential that signal and communication officers receive the earliest information possible concerning combat plans, developments and decisions in order that they can establish with the least delay the necessary means of control.

b. Signal orders and instructions. When time permits, the signal officer should obtain approval of his plan of signal communication, complete the detailed signal plan, and issue orders to the signal company. The installation of the signal system must not be delayed while awaiting the detailed attack plan. If any delay is contemplated the signal officer should order the advance party to proceed to the designated location of the command post to initiate installation of the signal system. More detailed orders can then be issued as further information of the tactical plan is obtained.

c. Instructions to subordinate units. Necessary coordinating instructions on signal matters should be communicated to subordinate units. These instructions may be issued at a conference between the communication officers and the signal officer while the latter is on visits of inspection, or they may be sent in messages or issued in the signal annex to the division field order for the attack. These instructions may concern messenger service, use of radio, location of signal supply distributing points, coordination of the wire system, and any other information of coordinating nature. Standing operating procedure reduces the volume of such orders.

42. COMMAND POSTS. a. The depth of advance planned by the commander will determine the number of probable displacements of command posts required. In recommending the specific location for the initial command post for the attack, the signal officer selects the location

as far forward as practicable. See paragraph 8 for factors to be considered in selecting the location.

b. The signal officer must be prepared to recommend a command post location and an axis of signal communication for any task force organized by the division.

43. COMMUNICATION DURING THE ATTACK. a. General. Time and space factors may not permit elaborate signal installations for the attack in a meeting engagement. The same factors may make it difficult to issue signal supplies. Prior to an attack against an organized position, provisions for greater security and more extensive installations usually are possible. These may include:

(1) Construction of protective shelters for signal installations at initial command posts,

(2) Laying additional wire,

(3) Extension of the wire axis as far forward as possible prior to the attack,

(4) Issue of detailed signal orders and instructions to insure that signal facilities are provided in accordance with the division commander's plan of action,

(5) Inspections to insure that such orders and instructions are understood and properly executed.

b. (1) *Message centers.* Operations of the message center at the command post may involve displacement of the message center from a temporary location established for the development to a more advanced location for the deployment, and then to the site chosen for the operation during combat. This displacement should be effected by "leap-frogging" the teams of the command post group. The message center is always prepared for displacement.

(2) *Advance message center.* The division commander's plan of attack may call for operations that will require the establishment of an advanced message center in the rear of the main effort. If this can be set up at a location to which the command post may displace, the time required for installation of signal facilities when the command post displaces will be materially reduced. The personnel of this message center comes from the advance party.

c. **Messengers.** After the attack has been launched, only special messengers normally are used forward of the division command post.

d. **Radio.** When surprise is important, operation of radio stations is limited initially to those units in contact with the enemy. Deception and surprise may be furthered by the operation of dummy stations. If the division is moving into an area for participation in the attack, it maintains radio silence until the attack is launched. If the division is already occupying a sector of a stabilized area, it continues radio operation prior to the attack, in the same way as formerly. If displaced to the flank or withdrawn from the area to make room for another unit, the division may provide dummy stations to continue normal operation until the attack is launched; or it may turn over its frequencies and call signs to the relieving unit. When the attack is launched, all restrictions on radio operation normally are removed. (See fig. 5.)

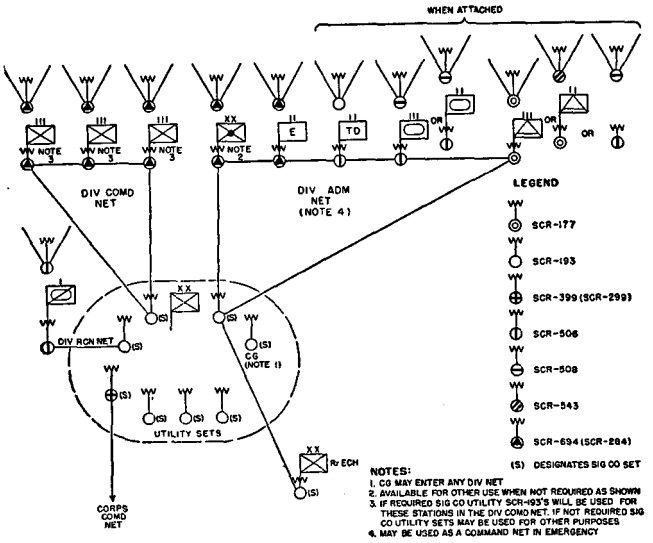


Figure 5. Radio nets for an infantry division.

e. **Dropped messages.** Care must be exercised in the employment of drop and pick-up message service during an attack because of the danger to airplanes from artillery fire.

f. **Pigeons.** Normally in the attack in a meeting engagement, pigeons are used only to the extent feasible on a march. (Paragraphs 28 and 34.) In an attack on an organized position, particularly when the division is operating as part of a larger force, the higher headquarters usually delivers baskets of pigeons for distribution within the division. (See FM 24–5 and FM 11–20.)

g. **Wire.** (1) *In meeting engagement.* For an attack in a meeting engagement, the initial wire system normally will include only minimum circuits essential to units and establishments.

(2) *In attack against an organized position.* When the attack is to be made against an organized position, the wire system can be greatly increased. The extent of this increase is limited by time and the amount of wire available. Normally, the number of circuits to subordinate units and establishments and the number of telephones at the command post will be increased. Telegraph service to major subordinate units will be established, and telegraph and teletypewriter service to the rear echelon and to adjacent and higher headquarters will be established also. The type and extent of protective shelters constructed for signal installations at the command post will be governed by the time available.

44. **SIGNAL SUPPLY.** Signal supplies seldom can be distributed during an attack in a meeting engagement. When the situation is more stabilized, as in an attack against an organized position, signal supplies usually can be distributed in the normal manner, with subordinate units drawing their supplies from one of the army signal depots. The stocks of signal supplies should be replenished as soon as possible.

Section VI. COMMUNICATION DURING REORGANIZATION

45. GENERAL. a. When an attack has reached its objective or has been unsuccessful, the division commander may decide or be ordered to renew the attack, to withdraw, or to defend. If the attack is continued, the forces may be regrouped, the scheme of maneuver may be changed, or reinforcements may be brought up. If the decision is to defend, there may be a reorganization in depth, with changes in the disposition of forces being carried out under cover of darkness. If the decision is to withdraw, operations may be continued to maintain the defense in place until dark; or, in exceptional circumstances, the withdrawal may be made in daylight.

b. Whichever of these actions is taken, the signal officer must be prepared to provide signal communication. As soon as he is informed of the commander's decision, he directs the signal company to modify and repair the existing signal system to support the new action. Command posts may be displaced; additional wire circuits may be provided to some units; supplementary existing facilities may be utilized; new test stations may be installed and advance message centers may be established.

46. COMMAND POSTS. a. If the decision has been reached to renew the attack and time permits, the command post should be moved if necessary, so as to be in the most suitable position for controlling the new attack. The same considerations are given to the location as are given when the command post site was selected for the initial attack. If the attack is to be resumed immediately the command post should not be moved until the attack is under way or until the first objective has been captured.

b. If the decision is to withdraw, the command post is left in its existing location and plans prepared for the withdrawal.

c. If it is planned to defend in the position then being

occupied, the command post should be moved if necessary, to the most favorable location for the defense.

47. **COMMUNICATION DURING REORGANIZATION.** The radio communication should be changed as little as possible during reorganization as any change at this time, especially in the amount and type of traffic, will give an alert enemy much desired information. Wire nets should be installed or changed as may be necessary to meet the new situation.

48. **SIGNAL SUPPLY.** The period during the reorganization usually furnishes an excellent time to replace batteries, repair equipment or exchange radio sets as may be necessary. Wire and construction teams should take this opportunity to repair wire circuits or lay new ones. Wire vehicles should replenish their wire supply; all vehicles should replenish their gasoline. Extra wire should be furnished all combat units that need it. Every effort should be expended to provide all echelons with the items they will need for the contemplated operations.

Section VII. COMMUNICATION DURING PURSUIT

49. **GENERAL.** When an enemy is forced to retreat, victory is completed by an immediate and relentless pursuit. The signal officer anticipates that all arms and units will be pushed to the extreme limit of physical endurance to provide a direct-pressure force which endeavors to break down all remaining resistance, while highly mobile forces are dispatched to strike the enemy in flank and rear and cut off his retreat. Maintenance of signal communication during the pursuit requires maximum effort on the part of signal troops.

50. **SIGNAL COMMUNICATION DURING PURSUIT.** a. **Message centers.** The speed of movement required by a vigorous pursuit may necessitate rapid and

numerous displacements of the command post. This will require continuous message center operation by all message center teams of the command post group. It may be advisable to establish an advance message center on the route followed by the encircling force, and it may be necessary to detail a message center team from the signal company to accompany the encircling force.

b. Messengers. The maximum number of available messengers is used at all established message centers. When distances are materially increased between a division and its rear elements, as many messengers as possible are stationed at relay points. Airplanes used for drop and pick-up service are desirable during the pursuit.

c. Pigeons. Pigeons are extremely helpful to certain elements of the division, such as the encircling force when it is operating at a distance from the command post and radio silence is necessary.

d. Radio. Radio normally is used freely by all pursuing units. It will be the most suitable means of communication for use by the encircling force and by similar forces that necessarily move to great distance from the division command post. The distance between these forces and the command post may become so great that the most powerful sets available to the division will have to be used. This will necessitate assigning signal company radio sets to these forces, and installing a radio set of similar power at the command post. Radio silence may be necessary at certain times to keep the movements of pursuing and encircling forces secret from the enemy. Radio operation within and between units of the pressure force may be governed by the same considerations as those which govern its operation in the attack. (See par. 43d.)

e. Visual. Panels may be used to identify pursuing or flanking forces to friendly airplanes. Communication by use of panels may be employed between liaison planes and the division message center and major pursuing elements.

f. Wire. The rapidity of pursuit normally will not permit the construction of wire circuits. Existing facilities

along the routes of pursuit are used if they are serviceable or easily repairable.

51. **SIGNAL SUPPLY.** Plans of the signal officer must include provision for the supply of any special forces used for pursuit and arrangement for distribution of these supplies to the forces prior to the initiation of the pursuit.

Section VIII. COMMUNICATION DURING WITHDRAWAL AND IN A DELAYING ACTION

52. **COMMUNICATION IN WITHDRAWAL FROM ACTION. a. Tactical operations.** Unless withdrawal in daylight is unavoidable, withdrawal of the greater part of the force usually commences at nightfall, with only weak elements left in immediate contact with the enemy. The withdrawal normally is executed on a broad front; troops retire initially in small columns and assemble into larger units at designated assembly areas. (FM 100–5.)

b. Division signal officer. The signal officer seeks early information regarding zones of action and routes of withdrawal of units, strength and operations of security forces, priority in withdrawal of units, and steps to clear the routes for the movement of troops.

(1) While the plan is being formulated the signal officer may be called upon to recommend the axes of signal communication of the division and major subordinate units. In making these recommendations, he should be guided by the location of existing wire lines. Effective use of these lines will increase materially the efficiency with which wire communication may be maintained during a withdrawal.

(2) Having obtained information of the plan of withdrawal, the signal officer makes plans for the communication system to be used by the division. Essential features of these plans are as follows:

(*a*) Regulation of radio operation, including the operation of dummy stations and the silencing or restricting of certain stations, is carried out so as to minimize the possi-

bility that this means of communication will provide the enemy with information of the withdrawal. Normal operation is simulated or continued in the old location.

(*b*) The most effective use possible is made of all wire circuits employed for the defense, in order to reduce the amount of new wire construction required by the withdrawing force.

(*c*) A part of the defensive wire system is retained for communication between and within the elements of the division left in contact with the enemy.

(3) If plans provide for a withdrawal to another defensive position, the signal officer prepares to initiate installation of the signal system at the new position as early as practicable.

c. Signal communication. In accordance with orders of the signal officer, the signal company continues operation of the defense signal system, prepares for rearward displacement of the command post, and initiates construction of such additional wire circuits as are necessary for establishment of the wire system for the withdrawal.

(1) In general wire circuits are held to a minimum, both in numbers and in length. Since the defense wire system normally is extensive, existing circuits will usually be found near the assembly position of each withdrawing unit. These circuits may be spliced to new circuits constructed to assembly areas. As units withdraw, wire lines not required by these units or by elements left in contact with the enemy are recovered, if such recovery does not dangerously delay the withdrawal of signal personnel and equipment; otherwise, they are destroyed.

(2) Normal radio operation is continued or simulated in the old location. Radio silence is enforced on the move and in the new location until danger of hostile discovery is past.

(3) During the period between the initiation of the withdrawal and the formation of march columns, the need for special messengers may be great. It is generally necessary to use advance message centers and to assign special messengers to each. The designation of the old command

post as an advance message center after rearward displacement of the command post may facilitate communication with elements left in contact with the enemy.

(4) Pigeons, distributed to units prior to the withdrawal, should be used to report the position of withdrawing units periodically to division headquarters, provided the lofts to which the birds will home are located in areas where withdrawal is not imminent. Pigeons not so employed are returned to the lofts in their baskets.

53. COMMUNICATION IN DELAYING ACTION. Delaying action is based on a limited resistance in a defensive position, with the intention of retarding enemy progress and gaining time, while avoiding decisive action. Timely measures must be taken for signal reconnaissance and for preparations necessary to establish signal communication at successive delaying positions, when such positions are used. Each of these installations is comparable to the initial system for an attack in a meeting engagement. (See par. 43.)

Section IX. COMMUNICATION DURING THE DEFENSIVE

54. DEFENSIVE POSITION. A defensive position is a zone of resistance consisting of a number of mutually supporting defense areas disposed irregularly in width and depth, each organized for all-around defense. A line joining the forward edge of the most advanced defense areas is called the main line of resistance. This is the line in front of which all elements must be able to concentrate their fires to break up the hostile attack. (See FM 100–5.)

55. COMMUNICATION SYSTEM FOR THE DEFENSE. The time available to organize the defense prior to enemy attack usually determines the extent of the signal installations. In a meeting engagement, when a division defends, time may seldom permit more than a hasty construction of field wire circuits; thus a considerable load

is placed on radio, messenger, pigeon, and visual communication. When time is available for complete organization of the ground and of defensive fires, the wire system may consist of multiple wire lines, making the use of radio and messengers prior to the attack almost unnecessary.

56. COMMAND POSTS. a. The signal officer anticipates that the enemy will make every effort to disrupt command and communication installations by the use of tank units, artillery fire, combat aviation, and airborne attacks. In recommending command post locations, he gives consideration to concealment, cover, and protective shelter for signal installations. He also considers the establishment of signal facilities at alternate command post locations. In a defensive action, command posts are located far enough forward so as to facilitate control of subordinate units, to secure protection by these units against enemy attacks, and to reduce the possibility that such attacks may isolate them from the troops they control. Precautions are taken to avoid disclosure of the locations of new command posts and signal installations.

b. Plans are prepared for the employment of the division reserve. Such plans include a location for the reserve command post. The signal officer provides for the installation of the signal communication facilities required by these plans. These plans should be flexible to meet possible changes.

57. COMMUNICATION FOR THE DEFENSE. a. **General.** The division signal system provides signal communication to the major subordinate units, to covering forces and division outposts, and to such other units and establishments as may require it. These include the division reserve, antitank units, observation posts, advance message centers, advance landing fields, attached troops, supply and evacuation establishments, and all echelons of division headquarters. If considerable time is spent in a given position, opportunity is afforded for closer coordination of the signal systems of the division and subordinate units, and for the installation of alternate command posts and wire lines.

b. Message centers. The message center normally will not be required to move when the division is in defensive operations. However, message center personnel must be prepared for displacement at all times. If advance message centers or alternate command posts are employed, teams from the advanced party of the command post group should be assigned to provide the desired signal communication at such locations.

c. Messengers. Special messengers normally are required during the occupation and organization of a defensive position. When the position has become stabilized, only scheduled messenger service is employed between the division command post, its rear echelon, and the command posts of major subordinate units, unless other means of signal communication are interrupted by enemy attack. If other means are disrupted by enemy action, it may be necessary to employ special messengers very freely and for numerous types of missions.

d. Pigeons. The use of pigeons is especially desirable between subordinate units and the division command post, when time permits the establishment of lofts near the command post, and when there is a possibility of enemy penetration and interruption of other signal means. Pigeons are distributed when troops go into position and arrangements are made for regular replacement. (See FM 11–5 and FM 11–20.)

e. Radio. (1) *Command net.* In a defensive situation, when wire communication and messenger service are available, it may be desirable to silence the command net to prevent the enemy from gaining valuable information.

(2) *Reconnaissance net.* It may be necessary for the reconnaissance net to operate so that the division commander can obtain information about enemy operations and troop disposition from reconnaissance units.

f. Visual. (1) *Lamps and flags.* Lamps and flags may be used from forward observation posts to rear installations.

(2) *Panels.* A panel station, if established, should be at some distance from the command post and near the division radio station of the division command net.

(3) *Pyrotechnics.* Pyrotechnics are seldom employed by the signal company in a defensive situation. They may be employed to advantage by smaller combat units as a means of transmitting prearranged messages.

g. **Wire.** (1) If contact with the enemy is imminent, the wire system should be rapidly constructed to take care of the immediate needs of the situation. If contact is not imminent or if the situation has become stabilized, the wire system should be more extensive and better constructed. If time and the tactical circumstances permit, the number of circuits to major subordinate units should be increased. Additional wire facilities, such as telegraph and teletypewriter, may be installed. New circuits should follow new routes. Circuits also should be laid to all units mentioned in a. above. Telephones at command posts may be increased in number. When a pigeon loft is located in the division area a long local circuit should be run to it.

(2) In static defensive situations lateral trunk lines are habitually installed between units down to battalions. Wire teams for construction of laterals may be furnished by the adjacent units to be connected or by the next superior unit depending upon the overall priority of the work to be done and the availability of wire teams. Between adjacent units wire communication is established without orders from left to right, unless their common superior directs otherwise. (See fig. 6.)

58. **SIGNAL SUPPLY.** Every effort is made to keep the stock of signal supplies at the required level during the defensive, and all shortages and depleted stocks should be replenished as promptly as possible.

59. **COMMUNICATION DURING CONDUCT OF DEFENSE.** The signal officer continually studies the signal system to locate weaknesses and overloaded facilities and prepares plans to meet emergencies. He makes inspections to insure that coordinating instructions are being correctly interpreted, and prepares plans for subsequent phases of the defense. It is essential that the signal officer obtain early

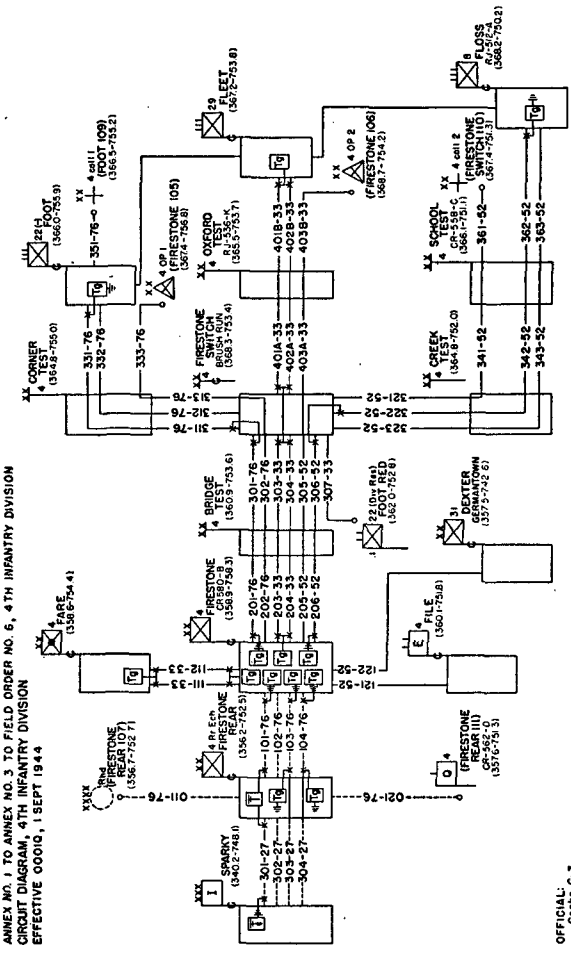


Figure 6. Division defensive wire system.

information about major changes in the tactical situation and in the commander's plans.

60. COMMUNICATION IN THE COUNTEROFFENSIVE. The period of transition from the defensive to the

counteroffensive is a critical one for signal communication. New locations are selected for command posts which have to move. During the counteroffensive, the various means of signal communication are used in much the same way as during the attack. (See par. 43.) The signal officer takes steps to replace wire and other signal supplies expended in the defense. Communication security methods are enforced to prevent the enemy obtaining information about plans for the counteroffensive.

Section X. COMMUNICATION FOR OTHER TACTICAL OPERATIONS

61. OTHER TACTICAL OPERATIONS. The operations discussed in the preceding sections do not include all those with which the signal officer and the signal company may be confronted. Many special situations, such as attack and defense of river lines, attack and defense of coast lines, landing on hostile shores, attack and defense of defiles and night combat, will be encountered in active operations, and their distinctive characteristics will have an important influence on signal communication. Each of these special operations require an estimate of the communication situation based on the actual tactical conditions. In any special operation, the pertinent factors involved must be considered in detail, and the plan for communication can then be formulated, the methods of employing the company in the various tactical operations discussed herein being used as a general guide. The signal officer and his subordinates must study each tactical situation and employ the available agencies and means of signal communication in the most efficient way to meet the needs of the commander and his staff.

CHAPTER 3

INFANTRY REGIMENT

Section I. GENERAL

62. PERSONNEL FOR SIGNAL COMMUNICATION. Tables of organization and equipment provide for personnel in all companies of the regiment whose primary duties are those of communication. Personnel, whose communication duties are secondary to their other duties, are provided also. Personnel in these two categories total approximately ten percent of the regimental strength. For details see current tables of organization and equipment for the infantry regiment.

63. RESPONSIBILITY FOR SIGNAL COMMUNICATION. a. Commanders. (1) The regimental commander is responsible for the installation, operation, and maintenance of the regimental communication system, and for supervision of the communication systems of his battalions. The commander of each subordinate unit is responsible for the communication system of his unit and for its functioning as a part of the regimental system. Although the superior commander is specifically charged with the maintenance of communication with his subordinate units, it is only through the joint effort of all concerned that communication can be maintained in combat. Contact is essential and if lost, its reestablishment is sought by both the subordinate unit and the higher unit.

(2) The orders of the regimental commander for the tactical employment of the regiment include provisions

for communication. The regimental communication officer is informed at the earliest practicable moment of the general plan of the operation and of the moves contemplated for the regimental command post; he must be prepared to recommend locations and movements of the command post as necessary. The regimental commander has the communication officer present when the field order of the higher commander is received to facilitate coordination with the division signal officer, and to insure early reconnaissance and recommendations for the regimental communication system.

(3) Each commander is responsible that the next higher headquarters is kept informed of the location and contemplated changes in the location of his command post.

b. Unit. (1) The regiment is responsible for wire communication from its command post to the command post of battalions, the command post of attached units, and, when required, the command posts of the antitank and cannon companies. The regiment is responsible for lateral communication between battalions. (See par. 75g.)

(2) A battalion is responsible for the installation and operation of any telephone lines needed between the battalion and its companies.

(3) Supporting units, such as artillery, are responsible for laying wire to the supported units.

(4) All units and activities are mutually responsible for the maintenance of wire lines used by them even though they did not construct them initially.

64. COMMUNICATION DUTIES OF PERSONNEL. **a.** Certain members of the regimental and battalion unit staffs have the following specific duties in connection with signal communication:

(1) *Adjutant* (S–1). (*a*) In collaboration with the communication officer, selects the exact site of the command post.

(*b*) Arranges the interior of the command post, including the allotting of space to the commander and staff sections, and supervises movements of the command post.

(*c*) See paragraph 64b(1) for additional duties of S–1 of a battalion.

(2) Intelligence officer (S–2). Informs communication officer of special security measures, arranges for communication with observation posts and other intelligence elements. Collaborates with communication officer in the preparation of prearranged messages for intelligence purposes.

(3) *Operations and training officer* (S–3). Exercises staff supervision over all signal communication matters and is responsible for advance planning in connection therewith. Collaborates with communication officer in exploiting use of prearranged messages in connection with operations.

(4) Supply officer (S–4). Procures and issues items of signal communication equipment.

b. Certain officers of the regimental and battalion special staff have the following specific duties in connection with signal communication:

(1) *Headquarters commandant.* Provides for the security of the command post in combat, utilizing personnel on duty at the command post and such combat troops as may be detailed for this purpose. (Paragraph 68g.) Maintains order within the command post, enforces camouflage and traffic discipline, and posts necessary signs or guides to indicate the location of the command post.

(2) *Regimental communication officer.* (*a*) Commands the communication platoon and is charged with establishing, operating, and maintaining the regimental communication system. Makes plans and recommendations for this system and advises the regimental commander and staff on matters of communication technique. He operates under the staff supervision of the S–3.

(*b*) In addition to his normal duties of command, the regimental communication officer has the following duties:

1. Supervising so much of the technical training of communication personnel throughout the regiment as may be delegated to him by the commander.

2. Submitting plans and recommendations for establishing a system of signal communication throughout the regiment during combat, and for technical supervision of the system to insure maximum coordination within the regiment and between it and the system of adjacent, supporting attached, and higher units.

3. Submitting recommendations for matter covered in paragraph 5 of a field order.

4. Preparing or securing from higher headquarters such orders and signal operation instructions as may be needed to insure tactical and technical control of the signal communication system of his unit. Distributing of these orders and signal operation instructions throughout his unit. Assisting the commander and staff in in preparation and distribution of prearranged message codes, brevity codes, and map coordinate codes. (See par. 8b.)

5. Furnishing technical advice and assistance to S–4 regarding the supply of signal communication material for the regiment.

6. Submitting recommendations relative to procurement and replacement of signal communication personnel.

(3) *Battalion communication officer.* The battalion communication officer's responsibility for training and operation is similar to that of the regimental communication officer. His duties include the following:

(*a*) Commanding the battalion communication platoon and directing its operations.

(*b*) Planning and supervising the installation, operation, and maintenance of the battalion communication system in conformity with the regimental plan of signal communication and the orders of the battalion commander.

c. **Certain other personnel within the regiment have the following specific communication duties.** (1) *Assistant regimental communication officer* (*Warrant officer*). Performs such duties as the regimental communication offi-

cer prescribes. He sees that the orders of the communication officer are executed and in the absence of that officer commands the regimental communication platoon. During displacement of the command post, he usually goes forward with the first echelon of the platoon.

(2) *Regimental communication chief.* The platoon sergeant is the regimental communication chief and the principal enlisted assistant of the regimental communication officer.

(3) *Battalion communication chief.* The platoon sergeant is the battalion communication chief, the second in command of the platoon, and the principal enlisted assistant of the battalion communication officer. He performs such duties as that officer prescribes; these generally are similar to those of the regimental communication warrant officer and communication chief.

(4) *Section leaders.* The chiefs of the wire, message center, and radio and visual sections, are responsible to their unit communication officer for the training and operation of their respective sections. They are responsible that their equipment is complete and is maintained in operating condition.

(5) *Other communication platoon personnel.* The remaining communication platoon personnel perform technical duties in conformity with the procedure prescribed in FM 24–5 and such other duties as may be prescribed by their unit communication officer.

(6) *Company communication personnel.* (*a*) The communication sergeant of each rifle company, heavy weapons company, cannon company, and antitank company serves as the message center for his respective company. Each receives, instructs, and dispatches messengers and agents; supervises the use and care of technical signaling equipment made available to the company; and follows a simplified form of procedure outlined in FM 24–5 for the message center chief and message dispatcher of small unit headquarters.

(*b*) *The first sergeant* establishes and operates the company command post. When the communication sergeant is performing duties away from the company command post,

the first sergeant may be required to operate or supervise the operation of the company message center.

(*c*) The *radiotelephone operators* are responsible for the operation and maintenance of their sets.

(*d*) The *bugler* is trained to act as a signalman, foot or motor messenger, and observer.

(*e*) The *messengers* may be employed as foot messengers, observers, guides, and assistants to other personnel at the company command post.

65. EQUIPMENT FOR SIGNAL COMMUNICATION. Tables of organization and equipment indicate the means of communication available for each organization in the regiment. These means may be changed by the issue of special equipment for a specific operation or by rearrangement of available items.

66. MEANS OF SIGNAL COMMUNICATION. a. General. (1) The technical equipment carried by the communication platoon consists of field wire with the means to lay and recover it; battery-operated telephones and telegraph instruments; sound-powered telephone sets; various types of key-operated and voice-operated radios; and visual signal equipment. Messengers are assigned to message center sections. During operations, the division signal company issues pigeons, when available and when their probable need is foreseen, to the regimental communication platoon.

(2) Reliance is not placed upon any one means of communication to the exclusion of others.

b. Telephones. (1) Battery-operated telephones are employed in the regimental wire net and with higher headquarters. A battalion in regimental reserve is not usually included in the regimental wire net except in defense or position warfare, but may be included if need for wire communication is foreseen.

(2) Sound-powered telephones are employed usually for local communication. They may be employed within a unit between the command post and the observation post, be-

tween mortar or gun positions and the observation posts, or between the unit's command post and the mortar or gun positions. The light weight of the hand-sets and wire reels of sound-powered telephone equipment permits its employment during situations involving frequent and rapid movement. Several hundred yards of wire can be laid by hand in a few minutes. A hand-set is merely clipped to each end of the wire to establish communication. Highly trained personnel are not required for the installation and operation of this equipment.

(3) Telephone conversations must be brief; they must also be discreet, since secrecy is never assured. The telephone is not used for long reports, orders, or messages when messenger or telegraph communication can be used. When practicable, telephone messages should be written out before being transmitted. This also facilitates entry in the unit journal.

c. Wire telegraph. Wire telegraph is usually established between regiment and division, and between regiment and its battalions. Circuits laid for telephone are utilized by simplexing the lines. Wire circuits especially for telegraph are never laid. (See FM 24–20 for explanation of methods employed.)

d. Radios. (1) Several types of radio equipment are provided for infantry communication. These are:

(*a*) Voice-and-key operated vehicular radio sets suitable for providing communication:

1. Between the regiment and higher and adjacent units, battalions, regimental train bivouac, intelligence and reconnaissance platoon, the regimental commander or a member of his staff during their movement, and liaison officers.
2. For column control with security detachments and for other special purposes.
3. Between individuals who have access to field telephones in the battalion or higher headquarters through the use of the remote control unit with the radio set.

(*b*) Portable short range radiotelephone sets light

enough to be carried readily by the operator. Examples of appropriate employment of these are between:

1. A battalion and its companies.
2. The regimental or battalion commander, while on reconnaissance, and his command post.
3. Reconnaissance, security, and intelligence detachments and the appropriate commanders.
4. Elements of a single column or between several columns for the purpose of march control.
5. A company and its platoons.

(2) Due to liability of hostile interception, messages whose contents may prove useful to the enemy are cryptographed (encoded or enciphered). Transmission of specific messages in clear text may be authorized by the commanding officer of any headquarters having a radio station or by his authorized representative. Regimental and subordinate commanders may authorize the normal transmission of radio messages in clear text which are to be acted upon immediately in fast moving situations. When written or oral messages in the clear are authorized, the maximum care must be taken to avoid disclosing the contents of future plans or the locations of friendly troops and installations. See paragraph 8b for information on brevity codes, map coordinate codes, and prearranged codes.

(3) The following additional precautions will be taken:

(*a*) Radio discipline and radio security must be strictly observed.

(*b*) Station identity should be established by authentication code.

(*c*) Call signs must be frequently changed and used as little as possible.

(*d*) The number of stations in a net should be limited to not more than six stations per net when practicable.

(4) Higher headquarters issues signal operation instructions in which each radio net is assigned call signs and frequencies. These are changed at intervals for security purposes.

(5) Radio stations should be located:

(*a*) At a sufficient distance from power lines, transformers, and other sources of electrical interference.

(*b*) Where the antenna is not screened by hill masses, dense woods, buildings, and other structures.

(*c*) Apart from other command post installations, in order to be free from noise and distractions.

(6) For details of radio procedure and cryptography, see FM 24–5, FM 24–6, FM 24–9, FM 24–18, TM 11–454 and TM 11–469.

e. Visual signaling. (1) Visual signaling includes all signals received by eye, regardless of the method of transmittal. Panels, arm-and-hand signals, pyrotechnics, including smoke, fall in this category and are all used by infantry. They are especially useful for sending prearranged signals and brief messages, particularly from front to rear, and from the ground to aircraft. Examples are: calls for supporting fires, ammunition, or reinforcements; announcements of enemy sighted, of ranges, of arrival at designated points; location of command post, of front lines, or direction of enemy resistance.

(2) For the use of visual signaling equipment and transmission procedure, see FM 24–5. For conventional arm-and-hand signals, see FM 22–5. For air-ground and panel signals, see FM 24–5, CCBP8 and appropriate air-ground liaison codes.

f. Sound signaling. Sound signaling is used chiefly to attract attention, to transmit short, prearranged messages and orders, and to give the alarm of gas, air, and mechanized attacks by whistles, bugles, sirens, klaxons, and small arms fire or devices commonly used by infantry for sound signaling. Sound signaling is not construed to include transmission of messages by voice or by radio, telephone, telegraph, or messenger.

g. Messengers. (1) Messengers are used by all infantry units. Both foot and motor messengers are used by regimental and battalion headquarters.

(2) All persons in the military service are required to assist messengers in the accomplishment of their mission.

(3) Double messengers are used when the mission is

important or there is danger of capture. Each carries a copy of the message. Ordinarily they keep within sight of each other, but far enough apart to avoid simultaneous ambush or exposure to the same burst of fire or the same shell.

(4) Messengers are carefully instructed as to the locations of command posts and other installations where they may be required to deliver messages, and the various routes leading thereto. The use of a map is recommended.

(5) Connecting files are used as required. They are particularly useful in maintaining contact between elements of a marching or deployed unit.

(6) Relay chains may be used to transmit written messages rapidly between two points when other means of communication fail or prove impracticable. The chain is formed by posting men at convenient intervals along a predetermined route connecting the two points. The distances between individuals in the chain are determined by the number of men available, the total distance between the two points, the nature of the terrain, enemy activity, and the speed of the individual.

h. Pigeons. Homing pigeons are an emergency means of signal communication used to transmit messages from front to rear when other means have failed. During operations, the division signal company issues pigeons in containers to the regimental communication platoon. Issues are made daily, or less often if appropriate. The regimental communication officer allots some of these pigeons to the communication platoons of those battalions which need them, and to the antitank and cannon companies if deemed advisable. Pigeons should not be kept confined away from their loft for a longer period than 2 days and 3 nights. (See FM 24–5 and FM 11–80.)

i. Airplanes. Airplanes are used as messengers by means of drop and pick-up messages. Dropping and pick-up grounds are established near unit command posts as required, and are identified by the display of panels.

67. ORDERS. a. General. Combat orders of all commanders include instructions for signal communication.

These instructions are placed in paragraph 5 of the field order. The amount of detail contained in this paragraph varies with the size of the command but should always contain:

(1) (*a*) Index to signal operation instructions in force.

(*b*) Restrictions, if any, on use of radio.

(*c*) Special pyrotechnic signals.

(2) Initial command post and/or axis of signal communication.

b. Orders of communication officer. After completing his reconnaissance and obtaining approval of his plan of communication, the regimental communication officer issues the necessary orders to his warrant officer, regimental communication chief, and his section chiefs. These orders are usually oral. An operation map or sketch is helpful. When communication personnel are well trained and have a standing operating procedure, the communication officer's instructions may be limited to an announcement of command post sites, the general plan of communication, and such special instructions as are necessary. Otherwise his orders may include any or all of the following items:

(1) *Instructions to message center chief.* (*a*) Location of message center.

(*b*) Station for messengers, schedules (if any), and routes.

(*c*) Use of codes and ciphers.

(*d*) Location of command posts of subordinate, attached, supporting, or adjacent units, and next higher unit, and the routes thereto.

(*e*) Other special instructions.

(2) *Instructions to radio chief.* (*a*) Location of radio stations.

(*b*) Special operation instructions and schedules, including any restrictions on use of radio.

(*c*) Use to be made of radiotelephones.

(*d*) Location of panel-display and message-dropping ground, and pick-up ground.

(3) *Instructions to wire chief.* (*a*) Location of the switchboard.

(*b*) Locations of local telephones, including telephone(s) at observation post(s).

(*c*) Use to be made of sound-powered telephone sets.

(*d*) Number and routes of trunk circuits (commonly given to personnel of wire section which may accompany the communication officer on his reconnaissance.)

(*e*) Number of telegraph channels to be installed.

(*f*) Special instructions pertaining to operation and maintenance.

(*g*) Instructions to wire chief may be supplemented by a circuit diagram and a line route map.

(4) *General instructions.* (*a*) Location of motor park and bivouac area of the regimental communication platoon.

(*b*) Reference to signal operation instructions.

(*c*) Location of communication officer.

c. Signal operation instructions. Signal operation instructions (SOI) are prepared by signal officers of divisions and larger units and issued to subordinate units. For examples and further details, see paragraph 8 and FM 24–5 and FM 101–5 (and FM 24–16 when published).

d. Standing operating procedure. See paragraph 8.

68. COMMAND POSTS. a. Definition. The command post of a unit is the headquarters of that unit in the field. It is the place where the staff works and where contact with the commander can always be secured. It is the nerve center of the communication system. In combat, a unit's headquarters is often divided into a forward echelon and a rear echelon; the forward echelon is called the command post.

b. Personnel. At the command post are the commander and his unit staff officers or their representatives; special staff officers as required (usually the headquarters commandant, the communication officer, gas officer, and regimental surgeon); and the enlisted personnel required for

its operation. These officers and enlisted men comprise the unit command group.

c. Location. See paragraph 8c for factors to be considered in selecting a command post.

(1) If not prescribed by higher authority, the location of the regimental or battalion command post is prescribed by the regimental commander. Recommendations for its general location (sometimes called flag location) are made to the commander by the S–3 following consultation with the communication officer. S–1 accompanied by the communication officer selects the exact site in the general vicinity of the designated point (par. 8c(4)).

(2) Rifle company command posts usually are not designated by higher authority. The executive officer and the first sergeant select the exact site on the ground within a general area designated by the company commander.

(3) Heavy weapons, antitank, and cannon companies locate their command posts in the vicinity of the command post of their superior headquarters.

d. Interior arrangement. (1) Installations within the command post are separated by at least 50 yards to prevent destruction of more than one by a single shell or bomb.

(2) The message center is located in the command post where it can be easily seen and reached by incoming messengers and others without interference with other command post installations.

(3) The messenger station is located within easy calling distance of the message center and in a place affording overhead concealment.

(4) The motor park is established in a place affording concealment from air and ground observation whenever practicable. It should be so located that its detection will not disclose the position of the command post.

(5) Radio sets are installed with due considerations for their operating characteristics and the possibility of mutual interference. Small radio telephone sets, when used primarily by an officer, may be kept near the user. Larger sets should be located away from the command post in order to minimize the possibility of enemy direction finders

locating and bringing fire to bear on the command post. Wire telegraph sets installed by the wire section, but operated by radio personnel, should be convenient to the message center.

(6) The panel display and dropping ground is located near the radio station. The area should be fairly level, open, free from high weeds and brush, and removed from high trees and bodies of water.

(7) When possible, the pick-up field should coincide with the panel display and dropping ground.

(8) The switchboard is installed in a location convenient to incoming wire circuits and affording as much shelter and freedom from noise and interference as possible.

(9) Telephones are installed as required. The battalion seldom uses more than two telephones, one for the commander and his staff, and one for the observation post. Remaining telephones are used for test purposes and for installation at the new command post during displacement. In a fast moving situation, the switchboard may be eliminated at a battalion command post and the telephone connected directly to the line from the regiment. The telephone at the battalion observation post may be connected to this line and form a party line. A switchboard is essential at the regimental command post in all situations when wire communication is maintained to forward elements, but in rapidly moving situations the number of local telephones is usually limited to three, one for the commander and the executive officer, one for the remainder of the staff, and one for the message center. In defensive situations, additional telephones are installed at the regimental and battalion command posts, and sometimes at company command posts. Several telephones are kept on hand for test purposes and for establishing service at the new command post during displacement.

(10) A guide to direct traffic is posted by the headquarters commandant in the vicinity of the command post.

e. **Operation.** (1) The command post is organized for continuous operation and to insure the necessary rest for personnel. Staff officers relieve each other and the com-

mander as necessary. Full use of signal communication facilities is made in the transmission of orders and messages.

(2) All incoming messengers go first to the message center. Message center personnel direct special messengers to the sergeant major who receipts for the message. Messages delivered by scheduled messengers are receipted for at the message center and turned over to the sergeant major. The sergeant major supervises the delivery of all messages to addressees, their circulation to interested staff officers and their return for entry in the unit journal. Staff officers mark on the messages their initials and any action taken. When leaving a command post all messengers pick up messages addressed to their own unit.

(3) Outgoing written messages are usually sent through the message center. After the message center chief receives notice that the message has been delivered, he places the duplicate copy in his dead file, which is turned over at intervals to S–1 for entry in the unit journal.

(4) Officers see that a synopsis of each message or order sent or received orally, or by telephone or radiotelephone, is sent to S–1 for entry in the unit journal. (See app. I for example of a circulation list.)

f. Conduct of personnel. Personnel of the command post are required to perform their duties quietly and in an orderly manner. Men are not permitted to loiter in the vicinity of the message center, the switchboard, the radio station, the panel grounds, or other command post installations where their presence makes for confusion, congestion, or distraction of operating personnel. They are warned against movement which might disclose the command post to enemy observation, and are instructed also to avoid making paths.

g. Security. The command post is provided incidental security against hostile air and ground forces by front line units and the reserve. However, the command post must be provided with a well planned system of local protection. The headquarters commandant is responsible for this security. He uses available personnel of the headquarters company who are at the command post, including communication personnel, and such other troops as may

be detailed for the purpose. Observers and small patrols should be employed to cover all approaches. The command post must be concealed from air observation. Air-antitank guards are posted to give warning of hostile mechanized or air approach, including the descent of hostile troops by parachute or glider. For the protection of personnel, fox holes are dug to provide individual protection against air and mechanized attack. Consideration should be given to locating the command post within the perimeter of the reserve.

h. Displacement. (1) *Regimental.* (*a*) When it appears that the command post may have to move, S–3 confers with the communication officer, and submits recommendations to the regimental commander. The latter prescribes the new command post location and at the proper time orders the movement made. The movement must be anticipated and reconnaissance and installations made in time to permit the accomplishment at the desired time. A procedure similar to the following is customary: S–1, accompanied by guides and the communication officer, together with personnel and equipment from each section of the communication platoon, goes to the new location, and selects the exact site and determines the location of the various installations. The communication officer then has communication means installed. S–1 then instructs and posts guides to meet the incoming personnel and vehicles and direct them to their places. After communication is operating at the new command post, and upon orders from the regimental commander or his designated assistant, the remainder of the command group moves to the new site.

(*b*) A staff officer remains at the old location with enough communication personnel to operate the agencies of signal communication, and to close those agencies when they are no longer required. The regimental communication chief supervises closing of those agencies at the old command post.

(*c*) When the command group arrives at the new location, signal communication is closed at the old location. All personnel left behind go to the new location, except a guide left to direct messengers.

(2) Battalion. In an offensive situation, the battalion command post is kept close to the attacking echelon in order to facilitate communication between the command post and the troops, and to afford protection to the command post. To permit rapid displacement, the movement of the command post must be anticipated and reconnaissance made in time to permit its accomplishment at the desired time. The communication officer keeps the wire head pushed close to the advancing troops in order that wire communication may be available when the command post is moved. When the battalion commander directs that the command post be moved forward, the staff and other personnel proceed to the new location without delay. It is desirable that a staff officer remain at the old location with enough communication personnel to operate the agencies of signal communication and to close these agencies when communication is established at the new command post. If the regiment has not prescribed the general location of command posts for the battalion along an axis of signal communication, the battalion commander prescribes the new location. The communication officer establishes communication in the new location in advance, when practicable. The regiment is kept informed of the movement.

69. **AXIS OF SIGNAL COMMUNICATION.** a. When practicable, the probable successive locations of command posts are selected in advance. The axis of signal communication is designated by naming these locations in the direction of movement. See paragraph 8c for instructions concerning designation of the axis of signal communication.

b. Advantage should be taken of any situation which permits the regiment and one of its battalions to use the same axis of signal communication. This effects a saving in both wire and labor, simplifies the communication system, and facilitates communication.

Section II. COMMUNICATION DURING A CONCENTRATION

70. **ACTIONS INVOLVED.** Prior to the arrival of the regiment in the division concentration area, a reconnais-

sance of the regimental area is made. The communication officers and linemen selected by them should be a part of the reconnaissance party. The regimental communication officer must receive the division signal plan and disposition of his unit at the earliest practicable time in order that he may plan and install the means of communication to be employed.

71. COMMUNICATION ACTIVITIES. During the period of the concentration, communication personnel operate the signal system, continue training activities, provide technical supervision in signal supply and maintenance, and prepare communication plans for contemplated operations. The following are covered:

a. Training. (1) Insuring that all communication personnel continue their training.

(2) Insuring adequate replacements for technically skilled personnel in event of casualties.

(3) Overcoming operating difficulties peculiar to the locality.

b. Supply and maintenance. (1) Assisting S–4 in completing allowances of signal equipment for the organization of the regiment.

(2) Technically inspecting signal communication items and recommending measures to perfect maintenance.

(3) Recommending additional equipment made necessary by the peculiarities of the area or nature of contemplated operations.

c. Communication plans. (1) Revising standing operating procedures pertaining to communication.

(2) Providing additional prearranged message and map coordinate codes as required by the commander.

72. COMMUNICATION DURING THE CONCENTRATION. a. Messengers. Motor messenger will be the normal means of communication between regiment and (1) division, (2) battalions, and (3) supply installations. Foot messengers normally will be employed within the subordinate units and installations.

b. Radio. Restrictions are placed upon radio operation to preserve secrecy and conserve power supplies. A reconnaissance and warning net will be operated if necessary. Transmissions in these two nets will be limited as may be necessary to preserve secrecy.

c. Wire. Commercial installations will be used to the maximum; additional construction will be held to the minimum necessary for adequate control. Instructions concerning use of commercial equipment will be furnished by the division signal officer.

d. Command posts. Elaborate installations are avoided. Each headquarters establishes itself within its allotted area so as to facilitate messenger service with subordinate units.

Section III. COMMUNICATION DURING MARCHES AND AT HALTS

73. GENERAL. Communication during marches and at halts must be maintained between the main body and its security and reconnaissance elements, between the main body and its trains, between march units of the column, and within these march units. The principal means of communication is radio, supplemented by messengers and pyrotechnics. Radio should be restricted or silenced if secrecy is imperative.

74. RADIO. Radios are used to their greatest extent allowable in all elements of the column. Command nets are organized down to include platoons. Some secrecy of movement is achieved through use of prearranged message codes and by reporting positions in reference to phase lines and march objectives.

75. MESSENGERS. Motor messenger forward and/or foot messengers to the rear supplement and relieve the radio through handling of routine traffic.

76. VISUAL. Pyrotechnics are employed to report the reaching of a phase line, for ground to air communication

and to warn of air or tank attack. Lookouts must be provided and allotted areas of responsibility in which to watch for pyrotechnic signals. Panels are used to identify friendly columns, specific vehicles in a column, command posts and message-drop and pick-up fields.

77. COMMAND POSTS. a. March command posts of regiment and battalions may be motorized and move by bounds in the spaces between units. Vehicles and personnel are held to a minimum consistent with control. Messengers and radio telephones should be provided.

b. March command posts are identified by vehicular marking panels when the air situation permits.

c. Antitank and cannon commanders march with their superior headquarters or with the headquarters to which they are attached or furnishing support. Radios and messengers furnish communication to their command posts and platoons.

d. Command posts of the column are located as follows:

(1) Advance guard—at head of the reserve.

(2) Regimental—at head of the main body.

(3) Battalions in the main body—at heads of respective battalions.

78. LOCATION OF COMMUNICATION PERSONNEL. Communication personnel not needed to maintain communication during the march are placed in the main body well up near the heads of their units, so as to be readily available. Communication transportation not needed with the command group marches at the head of the column transportation.

79. HALTS DURING THE MARCH. Halts afford opportunity to establish drop and pick-up message locations, and to regroup messengers and liaison agents. Agencies installed must be governed by the purpose and duration of halts, and by the need for rest.

80. HALTS UPON COMPLETION OF MARCH. a. Upon arrival in the bivouac area, motor messengers be-

come the principal means of communication between units, and foot messengers within units. The use of radios should be restricted to the same degree as during the march unless a greater restriction has been ordered or is indicated.

b. Wire communication is installed to the bivouac outpost by the unit responsible for the outpost. Messengers are used to supplement this wire. Radio and pyrotechnics will be available as alternate means. Wire and messenger means are used for communication within the outpost. The proposed time of occupancy and the enemy situation determine the extent of this wire net.

Section IV. COMMUNICATION DURING DEVELOPMENT

81. COMMUNICATION DURING DEVELOPMENT. During development for the attack, the means of signal communication used on the march are continued. Radios and messengers continue to be the principal means involved, supplemented by pyrotechnics for short prearranged messages.

a. The extent of radio communication is decided upon after a consideration of the previous condition of radio transmission, orders from higher headquarters, the necessity for secrecy and surprise, control, and the proximity of the enemy. Usually, radios which have been in operation will continue in operation unless the unit is making a secret movement. Reconnaissance and security detachments use prearranged messages or prearranged message codes.

b. This period of the operation increases the difficulties of messengers. The command is more deployed, march command posts are still in operation and are not identified with prominent terrain features. Messenger directions must be most explicit. The best messengers should be employed during this period.

c. The necessity for wire for control is not sufficient to offset the difficulties of maintaining wire in a development. Premature establishment of wire lines usually result

in loss of wire and delays installation for the effort to be made later.

d. Pyrotechnics are effective in transmitting control messages as a unit crosses a phase line.

82. COMMAND POSTS. March command posts are still in operation and located as in the march. If the main body and the units within it have deployed, the command post will be near the center and rear of the formations. The communication platoons are near their command posts.

83. DUTIES OF COMMUNICATION LEADERS. During this phase of the operation, the communication officers and their assistants extend their reconnaissance for command post sites and wire routes. They also plan the use of the agencies available as the situation develops.

84. ASSEMBLY AREAS. a. If, after partial deployment, a unit enters an assembly area, temporary command posts are established. Where conditions are favorable, the command posts of a regiment or battalion in an assembly area may be used as the initial command post for the attack. When it is so used, complete installations are made.

b. Messengers are the principal means of communication. Radio and pyrotechnics will not be employed where secrecy and surprise are more important than control.

c. Wire is not normally laid in assembly areas unless it can be incorporated in the communication system for the attack.

d. Commanders must make known their plans to their communication personnel at the earliest moment to enable them to reconnoiter, make recommendations for employment of agencies, and complete installation of the communication system prior to the attack.

Section V. COMMUNICATION DURING THE ATTACK

85. PLANNING AND ORDERS FOR THE ATTACK. a. Duties of personnel. (1) *Commanders.* When practicable, commanders of all echelons will have their commu-

nication officers accompany them to hear the order of their superior. This procedure will facilitate coordination of all communication agencies. Upon completion of the order, and after the commander has announced his plan, communication personnel are released for reconnaissance.

(2) *Communication officer.* (*a*) As soon as the regimental communication officer is informed of the plan of attack, he makes a map study and ground reconnaissance in order to establish a basis for his recommendations for paragraph 5 of the regimental attack order, and for his own orders to the communication platoon. At the same time, he reconnoiters for wire routes and plans communication installations. Before starting on reconnaissance, he may send the bulk of his unit forward toward the proposed location of the battle command post. He usually directs his section chiefs to report to him for instruction at or near the place where he plans to complete his reconnaissance.

(*b*) When practicable, after the recommendations of the communication officer are approved, a joint reconnaissance is made by S–1 and the communication officer to determine the exact locations of the command post and the motor park for the command and communication vehicles, and to decide upon the interior arrangement of the command post. If practicable this should be done as part of the reconnaissance covered in paragraph 85a (2) (*a*).

(*c*) At the command post site, after S–1 has indicated locations for the staff, the communication officer selects locations for the message center, switchboard, radio stations, panel-display and message-dropping ground, pick-up ground, and the bivouac area for the regimental communication platoon.

(*d*) The communication officer finds out where the observation posts are to be located in order to establish communication with them.

(*e*) The duties of a battalion communication officer prior to the establishment of the command post are substantially the same as those outlined above for the regimental communication officer.

(3) *Communication sergeant.* (*a*) *Rifle company.* The communication sergeant assists the company commander in observation and control. He supervises all visual signals, assists in organizing observation over the company front, and supervises the installation and operation of other technical signaling equipment made available to the company. He receives and dispatches the messengers and agents who are with the company commander, and performs such other duties as the latter may direct.

(*b*) *Other companies.* The communication sergeant is responsible for the establishment and operation of the unit message center at the company command post, and the operation and maintenance of communication equipment throughout the company. In performing this mission, he is assisted by the bugler, messengers, and such other personnel as the company commander may direct.

b. Orders. (1) *Commanders.* When issuing his attack order, the commander provides for signal communication in paragraph 5. His bases for this paragraph are the orders he receives from higher headquarters and the recommendations he receives from the communication officer or communication sergeant. He includes only so much of the standard paragraph 5 as is applicable to this situation.

(2) *Communication officers.* After completing his reconnaissance and obtaining approval of his plan of communication, the regimental communication officer issues the necessary orders to his warrant officer, regimental communication chief, and section chiefs. These orders are usually issued orally. An operation map is helpful.

86. COMMUNICATION DURING THE ATTACK.

a. Wire. Wire is the principal means of communication in the attack. The division signal company will install trunk lines into the regimental command post and usually directs that the wire party remain at the command post to extend and maintain these lines.

(1) (*a*) The *regimental communication platoon* will install one trunk line to each battalion in the attacking echelon and to attached units. (See fig. 7.)

(*b*) Wire normally will not be laid to a battalion in reserve.

(*c*) One trunk line may be laid to the cannon company command post.

(*d*) The observation post and radio remote control units are connected with the switchboard.

(*e*) Division and battalion lines will be simplexed for telegraph.

(*f*) A minimum of locals will be provided within the regimental command post to facilitate its operation. One for the commanding officer and executive officer, one for the staff officers, and one at the message center, are considered a minimum.

(*g*) Sound-powered telephone equipment should be used to establish communication with the command posts of the antitank company and the intelligence and reconnaissance platoon when located in the immediate vicinity.

(*h*) The remaining sound-powered telephones should be used to connect the headquarters commandant with his

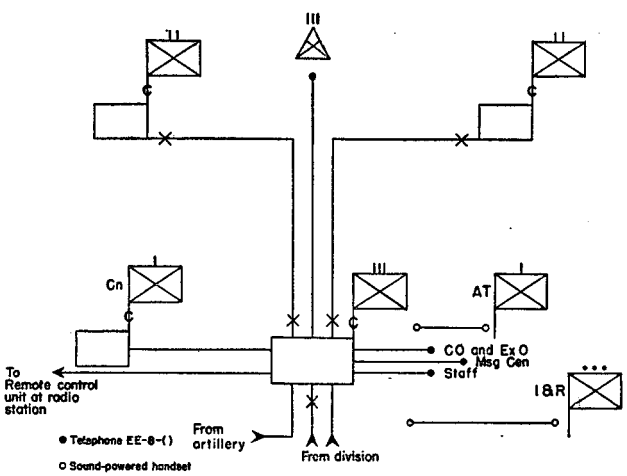


Figure 7. Suggested wire net for a regiment in attack. Wire normally will not be laid to a battalion in reserve.

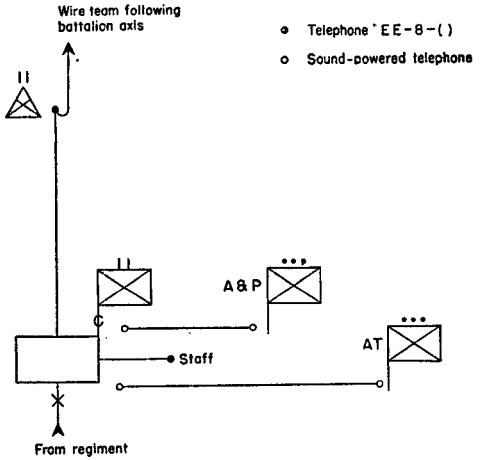


Figure 8. Suggested wire net for a battalion in attack.

sentry listening posts, the motor park, or guide at the command post flag location.

(2) (*a*) The *battalion communication platoon* (fig. 8) will install one line to its observation post.

(*b*) The reduced size of the battalion switchboard limits the number of permissable local circuits. The minimum number of installations consistent with effective control should be installed. One staff phone will usually suffice.

(*c*) Sound-powered telephones should be installed to the antitank platoon command post and the ammunition and pioneer platoon command post or the battalion ammunition supply point.

(*d*) In some attack situations it will be feasible to install sound-powered equipment from the battalion observation post to the command or observation posts of the attacking echelon. (See fig. 9.)

(3) The *rifle company* will employ its sound-powered telephone equipment as the situation dictates. (See fig. 10.) Because of the limited amount available, the company commander must avoid stereotyped employment and study each situation so as to derive the most control from

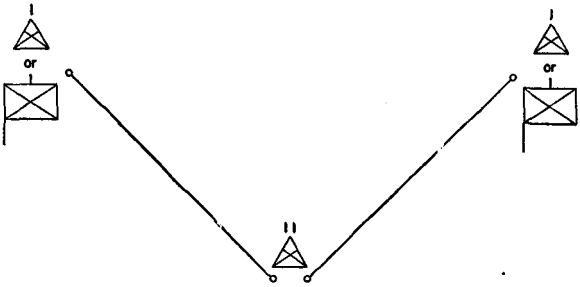


Figure 9. An installation to be made when conditions permit.

the equipment. He should not hesitate to request additional equipment when he believes it to be essential.

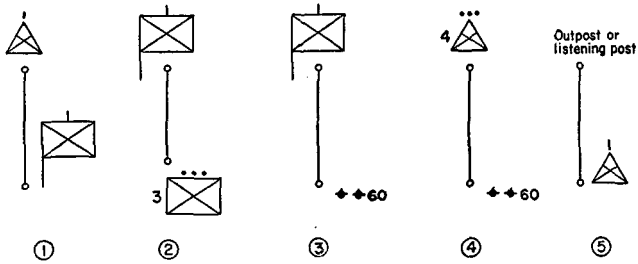


Figure 10. Five suggested methods of employing the sound-powered equipment in a rifle company.

(4) The *heavy weapons company* employs its sound-powered equipment principally for fire control. However, certain channels are provided for command within the company. (See fig. 11.)

(5) Sound-powered equipment is allocated to each platoon of the *cannon company* for communication from the observation post to the gun positions. (See fig. 12.) When circumstances permit, the company may install lines to each platoon command post and a long local to the company observation post. (See fig. 13.)

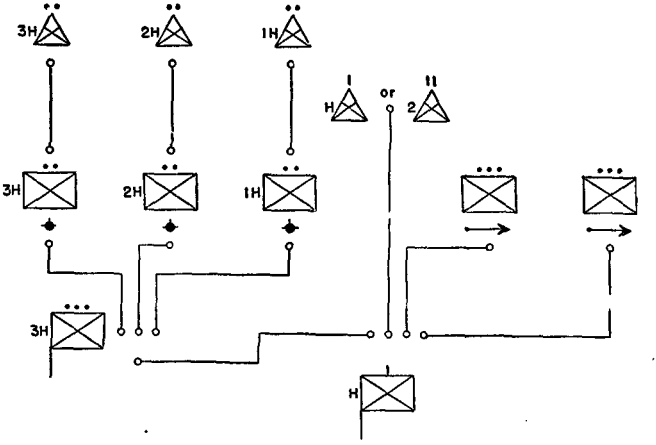


Figure 11. A suggested method of employing the wire equipment in a heavy weapons company.

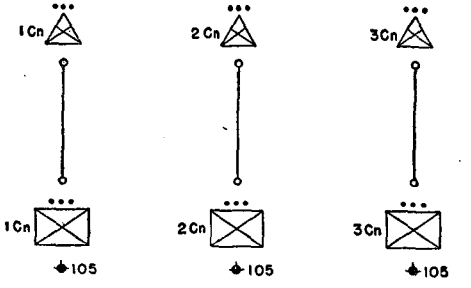


Figure 12. Suggested use of the sound-powered telephones for fire control by the cannon company.

(6) The *antitank company* will employ its sound-powered equipment to establish communication between the company command post and the platoons, between the platoons and the unit they are supporting.

b. Radio. Maximum use is made of radio in the attack. Secrecy and surprise may dictate that the use of radios be restricted until H-hour and further restriction in the

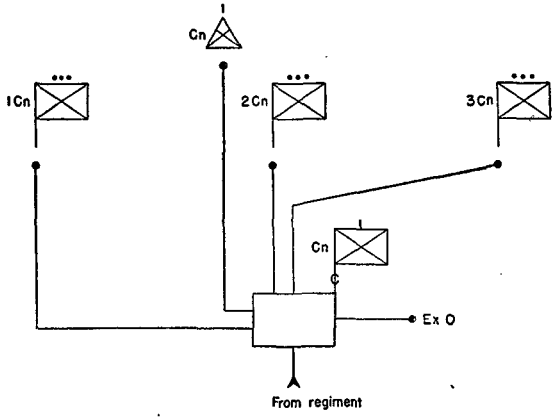


Figure 13. Suggested cannon company command wire net.

use of radios may be indicated for maneuvering and reserve units prior to commitment.

(1) *Regiment.* (*a*) The regimental command post operates a key radio set in the division command net. A regimental command net is established to include the battalions of the attacking echelon. The reserve battalion will listen in on this net and will enter it when committed. (See fig. 14.)

(*b*) The regiment usually will establish a special pur-

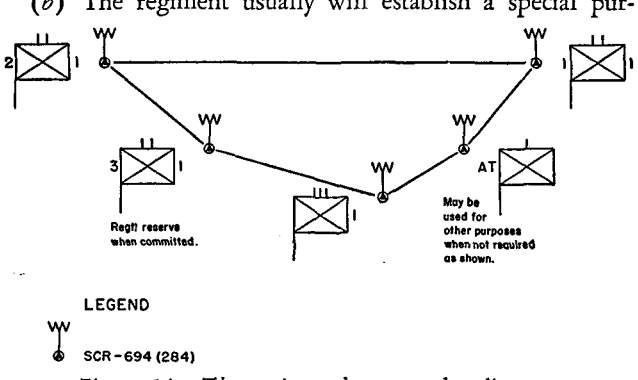


Figure 14. The regimental command radio net.

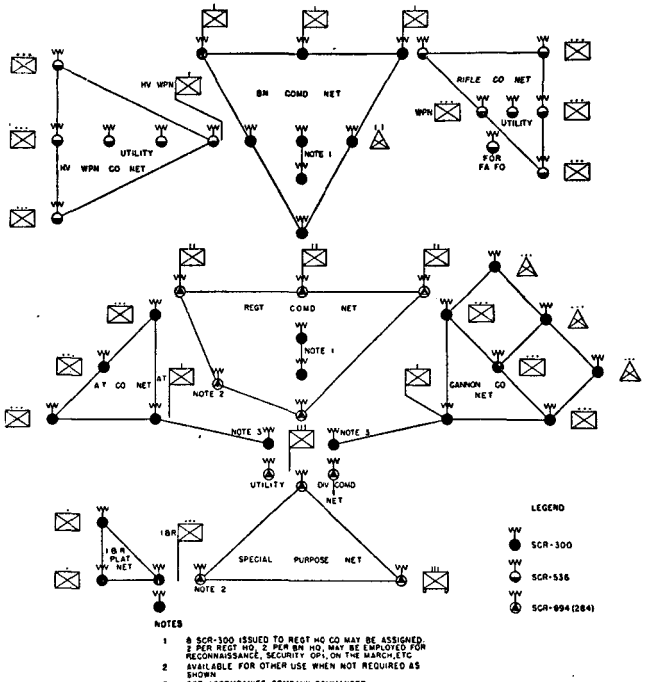


Figure 15. Various radio nets in an infantry regiment.

pose net by employing a radio at the command post, one with the intelligence and reconnaissance platoon, and one at the train bivouac. This provides the commander with a quick means of communication with these distant elements. (See fig. 16.)

(*c*) The regimental commander takes a radio with him when he leaves the command post. He usually takes a low-powered voice radio set in order to maintain contact with the command post only. If he desires to communicate in the division command net, the regimental command net, or the special purpose net, he must take a higher power key or voice radio.

(*d*) Additional radios provided will be used as the situation dictates. Possible solutions include a liaison net, recon-

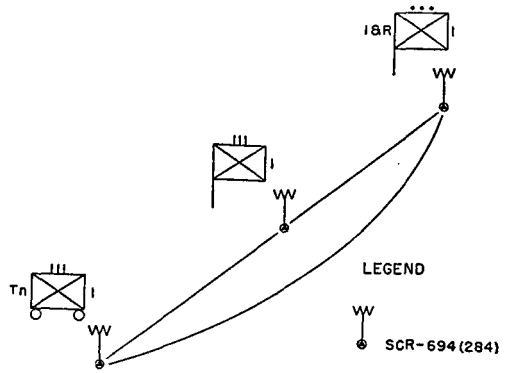


Figure 16. Special purpose net for an infantry regiment.

naissance and security detachments, or a medical net. The communication officer must exercise a positive influence over these radios to insure maximum effectiveness.

(2) *Battalion.* (*a*) The battalion operates a radio in the regimental command net.

(*b*) A battalion command net is established habitually by sending a radio to each company. (See fig. 17.) Operators for these sets are furnished by the company receiving the set. The reserve company will listen in and then enter the net when committed.

(*c*) When the battalion commander leaves the command post, he is accompanied by a radio to enable him to remain in contact with the battalion command net. This

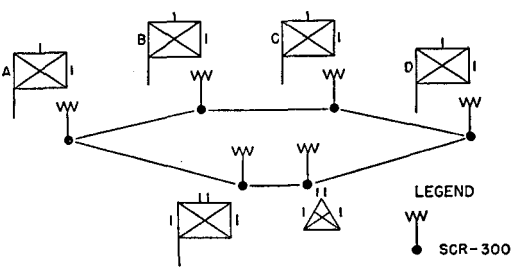


Figure 17. Battalion command radio net.

may be done by using the same type set as used in the battalion command net.

(3) *Rifle and heavy weapons companies.* Rifle and heavy weapons companies establish command nets to include all platoons. (See figs. 18 and 19.) Additional radios are employed on reconnaissance and security patrols, to detachments, to company observation post, to the motor park, or to the company ammunition supply point. One of the rifle company radio sets is reserved for the field artillery forward observer. This set remains in the possession of the forward observer as long as he is operating in the battalion area.

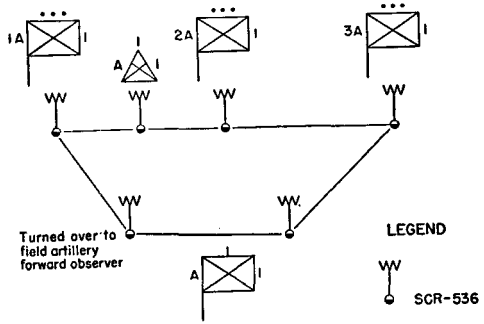


Figure 18. Suggested rifle company radio net.

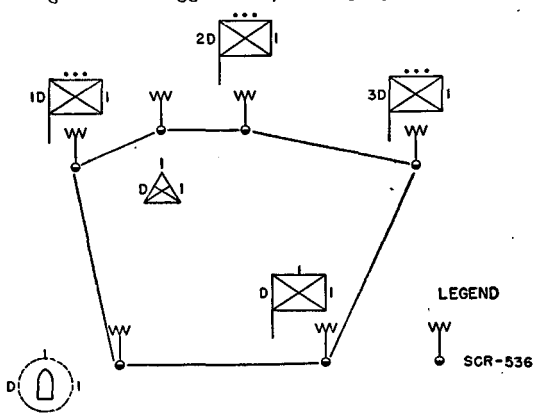


Figure 19. Suggested heavy weapons company radio net.

(4) *Antitank company* (*a*) This company operates in the regimental command net. This set is available for other purposes where necessary.

(*b*) A command net including the company command posts, the company commander and the gun platoons is established. (See fig. 20.)

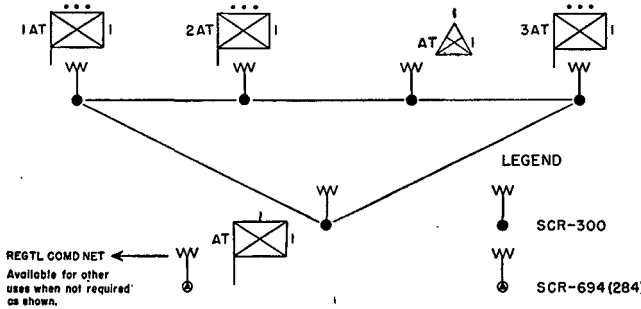


Figure 20. Suggested antitank company radio net.

(5) *Cannon company.* The cannon company establishes a command and warning net including the company command post, the company commander, and the platoon command posts and observation posts. (See fig. 21.)

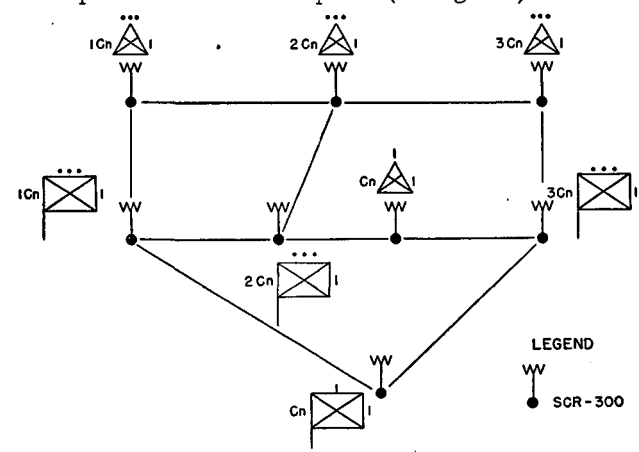


Figure 21. Suggested employment of cannon company radios.

c. **Visual.** (1) Marking panels are used to mark front lines, to indicate targets, mark bomb lines, and for other prearranged signals to airplanes.

(2) Pyrotechnics may be employed to send prearranged messages to report contacts, counterattacks, objectives reached, and to make emergency calls for delivery and lifting of artillery fires. Colored smokes may be used alone or in conjunction with panels to mark front lines and for other purposes as indicated above for marking panels.

d. **Messengers.** Messengers are employed to supplement the electrical communication system.

87. **COMMAND POSTS. a. Regimental and battalion.** Initial command posts of regiments and battalions should be selected as close to the line of departure as practicable in order to avoid displacement during the early stages of the attack (par. 8c). Prompt forward displacement must be made as the attack progresses in order that good wire and messenger communication can be maintained.

b. **Rifle company.** The rifle company command post should be located close to the line of departure. It is moved forward as the company advances. New locations are reported to the battalion command post.

c. **Heavy weapons, antitank, and cannon companies.** Command posts of the heavy weapons, antitank, and cannon companies are located in the vicinity of the command posts of the superior unit.

88. **WIRE COMMUNICATION WHEN A REGIMENTAL COMMAND POST IS MOVED. a. Method "A".** If the regimental command post is moved to a point on the wire line leading to one of the battalions the switchboard is cut into this line as shown in figure 22.

(1) Without disrupting the circuit remove sufficient insulation from the pair of wires to allow attaching to a pair of binding posts in the rear of the switchboard. Repeat this process and connect to a second pair of binding posts.

(See fig. 22②). Since these lines are to be simplexed for telegraph make the connections to the lower numbered binding posts (those associated with repeating coils). With a short piece of scrap wire, interconnect the telegraph legs of the two units being used. As soon as the lines are connected to the board the switchboard operator may listen in on these lines by placing the key of one of the pairs in the listening position.

(*a*) If no conversation is in progress interconnect the

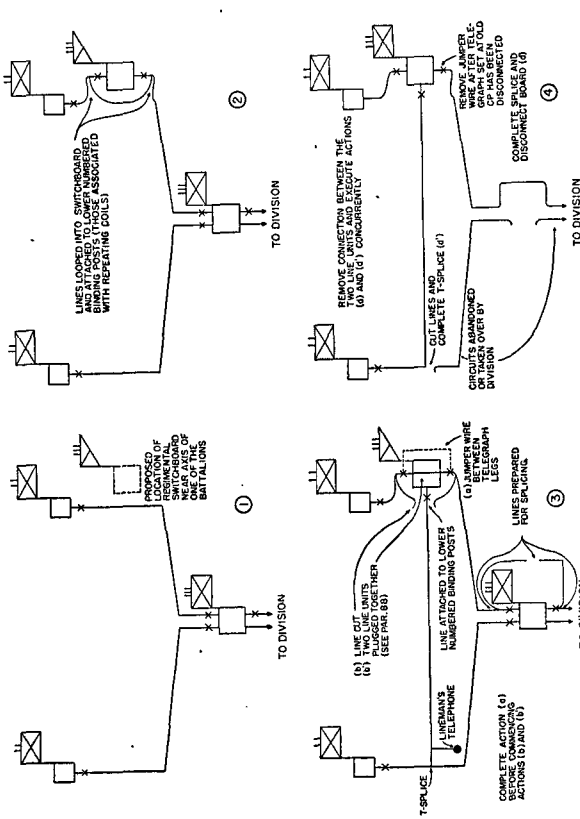


Figure 22. Movement of regimental switchboard. Method "A." In this case the wire team from division must lay the second line to the new location.

two line units using the plug and cord of one of the two units, and cut the pair of wires between the two points where connections were made to the binding posts. DO NOT CUT THIS LOOP UNTIL AFTER THE TELEGRAPH LEGS HAVE BEEN CONNECTED.

(*b*) If conversation is in progress between the regiment and the battalion care must be exercised in plugging the two units together. While listening to the conversation, carefully place one of the plugs into the jack of the other unit. If the line goes dead, immediately withdraw the plug and reverse the connections made at one of the two pairs of binding posts, and again test with the plug. If the conversation continues without interruption leave the plug inserted and cut the loop of wire as in (*a*) above.

(*c*) The interconnection between these two units remains until the old switchboard is removed from the line and the new board takes over.

(2) To connect the other battalion a pair of wires is laid to the nearest point on the line extending from the old regimental switchboard to the battalion in question, and a T-splice made at that point (fig. 22③). The lineman then bridges his telephone across the line and awaits the signal to cut the line and complete the splice.

(3) Connections for a third battalion are made in the same manner.

(4) Just as soon as orders are received to remove the old switchboard this information is given to both switchboard operators and to the linemen in (2) and (3) above.

(*a*) The rear or old switchboard is removed from the line and the proper lines spliced as in figure 22④.

(*b*) The new or forward switchboard operator takes over. If no conversation is in progress over the two line units that have been interconnected at the switchboard, the interconnecting cord and plug are withdrawn. If conversation is in progress the new switchboard operator takes over supervision of the connection.

(*c*) The linemen at the T-splices cut the lines and complete the splices as shown in figure 22④.

b. Method "B". If the regimental command post is to move to a location not on one of the battalion lines the procedure shown in Figure 23 is used.

(1) (*a*) Two pairs of wires are laid to the closest battalion line and both pairs T-spliced to this line. (See fig. 23②.) A lineman then bridges his telephone across one of the pairs and, if no conversation is in progress signals the new switchboard. (Remember that a signal from the lineman's telephone will throw the drops on all three switchboards.)

(*b*) Before the wire team leaves to lay these lines the ends are connected to two pairs of binding posts. Use the lower numbered pairs. The telegraph legs of the two selected pair are interconnected by means of a short piece of wire.

(*c*) When the signal (*a*) is received the switchboard operator answers and upon learning that the lineman is ready to complete the T-splices gives the signal to cut and at the same time interconnects the two circuits by placing the plug of one circuit into the jack of the other. The lineman cuts the original battalion line between the two T-splices and completes the taping of the splices. (See fig. 23③).

(2) The twisted pairs laid to the closest points on the other battalion lines are accomplished as in 88a (2).

(3) The action enumerated in 88a (4) is then followed to complete Method "B".

c. Method "C". It will be noted that in both Method "A" and Method "B" only one circuit to division remains after the old switchboard is cut out. In Method "C" this is overcome by laying two circuits in place of one to second closest battalion line (fig. 24).

(1) The double circuit to the closest battalion line is the same as for Method "B".

(2) The first pair of wires laid to the second closest battalion line is handled as in Method "B". A second

Figure 23. Movement of regimental switchboard. Method "B." In this case the wire team from division must lay the second line to the new location.

pair of wires is tied into the switchboard on one of the higher numbered units. These two pairs of wires should be marked since the one not connected through the repeating coil must be T-spliced to the battalion line on the side toward the old regimental switchboard, while the pair that connects through the repeating coil must terminate in the T-splice closest to the battalion board. The cutting of the line between the two splices is accomplished at the time the old regiment switchboard is removed from the circuit (fig. 24④).

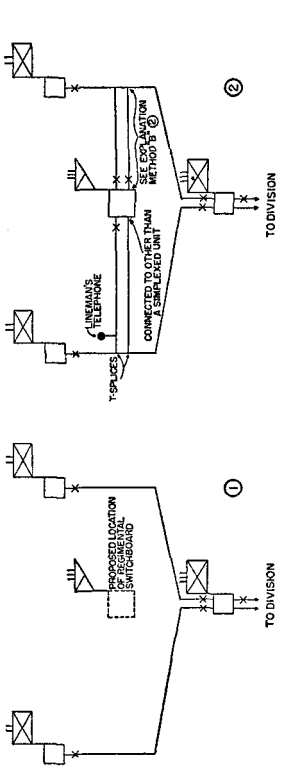


Figure 24. Movement of regimental switchboard. Method "C." Note. In this method both lines to division are retained.

Section VI. COMMUNICATION DURING REORGANIZATION

89. COMMUNICATION DURING REORGANIZATION. During reorganization, all means of communication employed during the attack are continued in operation. The communication officer effects repairs and improvements in the communication system, initiates replacement for personnel and equipment and makes recommendations for changes incident to the next operation. Every effort is

made to repair or replace faulty communication equipment and to resupply units with needed wire and batteries.

Section VII. COMMUNICATION DURING PURSUIT

90. MEANS OF SIGNAL COMMUNICATION. a. Radio is the principal means of communication during the pursuit, wire being employed when the advance is not so fast as to prevent it. Pyrotechnics are the principal visual means.

b. If the regiment is used as an encircling force, radio is usually restricted prior to contact in order to maintain secrecy. When distances are great, the division signal company will furnish a more powerful radio than those organic within the regiment to accompany the force.

Section VIII. COMMUNICATION DURING WITHDRAWAL AND IN A DELAYING ACTION

91. WITHDRAWAL. a. General. *Communication* necessary during the withdrawal of an infantry regiment requires careful planning and a detailed reconnaissance. (1) Plans must be made to provide communication:

(*a*) In the old position.

(*b*) During the movement to the rear position.

(*c*) After arrival on the rear position.

(2) A reconnaissance must be made of the route of withdrawal to determine what existing wire circuits may be used to provide communication to various asembly points and between the forward and rear command posts. The reconnaissance should include the rear position so that communication installations can be initiated at that point as early as practicable. Although reconnaissance details are usually limited in size, the bulk of the communication personnel thereon should be wire men. The reconnaissance

should be conducted during daylight hours; this is true for night withdrawals also.

b. Old positions. (1) During the initial stages of the withdrawal existing signal communication facilities are maintained on the old position. Regimental and battalion command posts remain open in their old locations until the bulk of their units has cleared the local covering forces. When command posts move to the rear a small detail is left to operate the facilities being employed by the covering force commander.

(2) Maximum use is made of existing wire circuits by the covering force. New circuits are seldom laid. Unused circuits are recovered if time permits; otherwise they are cut and sections removed to prevent early use of the lines by the enemy.

(3) Radio traffic is continued for the purpose of deception.

c. During movement to the rear. (1) The routes of withdrawal of battalion command posts are stated in regimental orders. If it is necessary to depart from these routes, battalions are required to make immediate reports.

(2) Communication between assembly points and the old command post is established by employing existing wire circuits or by using messengers.

(3) Radio is seldom employed by units actually withdrawing.

d. After arrival on the rear position. (1) Every effort is made to complete all wire circuits on the rear position prior to arrival of units. For a night withdrawal the construction of circuits is usually not commenced until after dark. The forward and rear command posts should be connected by wire (par. 91*a*(2)).

(2) Radios are silenced in the new position until the enemy has learned of the withdrawal.

92. DELAYING ACTION. In a delaying action, communication methods are similar to those used in the attack or in hasty defense. Emphasis is placed on mobility. Preparations are made for rapid displacement rearward. Installa-

tions are reduced and kept to the minimum. Sound-powered telephones replace battery-operated telephones wherever possible. Timely measures are taken for signal reconnaissance and for establishment of communication on successive delaying positions. Wire lines are laid to battalions. The regiment does not ordinarily lay wire between successive positions.

Section IX. COMMUNICATION DURING THE DEFENSE

93. DUTIES. For duties of the commander and communication personnel, see section V of this chapter.

94. MEANS OF SIGNAL COMMUNICATION. a. **Wire.** Initially, a wire system similar to that for the attack will be installed. As time permits, this system will be increased (fig. 25).

(1) *Regiment.* (*a*) The regimental communication platoon installs an additional trunk line to each front-line battalion.

(*b*) A lateral trunk line is installed into the command post of the regiment on the right.

(*c*) The regiment on the left installs a lateral trunk line into the regimental command post.

(*d*) Additional local lines within the command post will be provided on the basis of one for each two staff sections.

(*e*) A single trunk circuit may be installed to the general outpost command post, to the defense positions prepared for occupancy, and to the assembly area of the reserve battalion.

(*f*) A single line will be laid to the command post of the outpost battalion.

(*g*) Wire communication may be established with the train bivouac and the ammunition supply point.

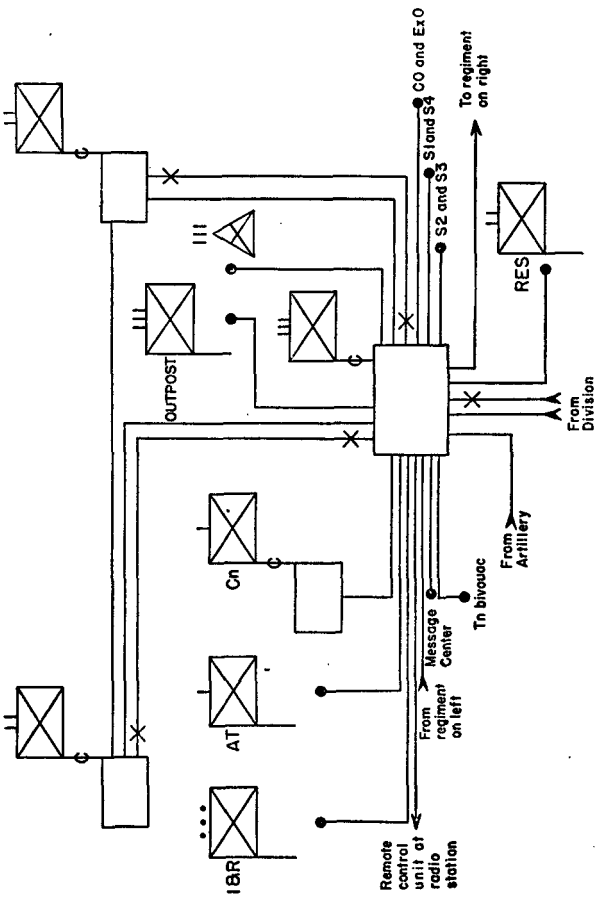


Figure 25. Suggested wire net for a regiment on defense.

(*b*) Sound-powered equipment and unused units on the switchboard may be used for additional radio station lines or between the headquarters commandant and the security detachments or the motor park.

(2) *Battalion.* (*a*) Unlike the regimental communication platoon, the battalion communication platoon has no

extra switchboard equipment readily available for use in the defense.

(*b*) Like the regimental system, a wire system similar to that for an attack is installed initially.

(*c*) Wire lines are laid to each front line company. It will be necessary to party these lines with some other line, preferably that to the observation post (fig. 26).

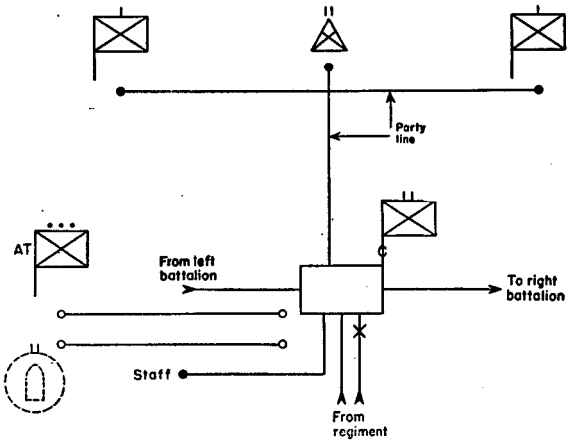


Figure 26. Suggested wire net for a battalion on defense.

(*d*) Sound-powered equipment is used to increase communication within the command post and with additional subordinate elements.

(3) *Companies.* The rifle and weapons companies employ their wire for fire control in the defense as in the attack.

b. Radio. Normally, when radios with the outpost and within the defensive position are not needed for control, their operation will be restricted until the enemy has contacted the position. Radio is used when wire communication is interrupted or inadequate.

c. Messenger. (1) Messengers will be used to supplement the electrical means of communication.

(2) Motor messengers to rear installations will be used extensively.

d. Visual. Pyrotechnics can be used effectively with a prearranged code for contacts, location of penetrations and control of artillery fires. Panels are used in the same manner as for the attack.

95. COMMAND POSTS. a. General. (1) Alternate locations should be selected for all command posts, and for all communication facilities installed to and within these sites to prevent lengthy interruptions by enemy action.

(2) All command posts must be located within or behind the reserve unit to prevent interference as the result of minor penetrations.

Section X. COMMUNICATION DURING OTHER TACTICAL OPERATIONS

96. ATTACK AND DEFENSE OF A RIVER LINE. a. Attack. (1) *Prior to crossing.* (*a*) Wire and foot messengers are the principal means employed.

(*b*) A minimum wire system is installed upon completion of the movement into forward assembly areas.

(*c*) Motor messengers are employed in the forward area only when there are no restrictions on the operation of vehicles within this area.

(*d*) Pyrotechnics and radio operation are restricted at this time, and until the crossing is discovered by the enemy.

(2) *During the crossing.* (*a*) Radio communication while ideally suited for this phase of operation, must be restricted until the crossing has been discovered by the enemy.

(*b*) A wire circuit is, in every case, established across the stream by the most practical method as soon as possible. If the width of the river permits, wire is placed overhead. When wire cannot be placed overhead, it may be placed in the water provided the current is not too

swift. When neither is possible wire communication with the far bank is installed on completion of the engineer foot bridge.

(3) *After the crossing.* (*a*) All means of communication will be employed to the maximum.

(*b*) Assault boats are used for messengers. These will have been allotted to the communication officer for this purpose.

b. **Defense.** Wire communication is installed to each outguard along the river bank and to the mobile reserve assembly areas. Radio operation is restricted prior to the time the enemy contacts the outpost. It becomes a primary means during the conduct of the defense. Messengers are employed extensively throughout.

97. COMMUNICATION IN UNUSUAL CLIMATES AND TERRAIN. Unusual climatic conditions and certain types of terrain such as mountains, densely wooded country or jungles influence signal communication considerably. (See FM 70–10, FM 70–15 and FM 72–20 when published.)

98. TANK-INFANTRY COMMUNICATION. Successful operation of the infantry tank-team depends to a large extent upon good communication between all elements of the team. The highest degree of initiative and cooperation is required of the communication officer concerned. When tanks are detailed to work with infantry sufficient time must be allowed for perfection of communication arrangements. Facilities are provided for radio communication between small infantry and tank units; in addition installations are made on tanks to permit telephone communication from outside to those inside. Prearranged visual signals may also be employed. (See supplement No. 1 FM 17–36, Employment of Tanks with Infantry.)

CHAPTER 4

DIVISION ARTILLERY

Section I. GENERAL

99. ORGANIZATION. a. General. Organization of division artillery, motorized, of an infantry division, is indicated in figure 27. Organization of a medium field artillery battalion is similar to the organization of a light field artillery battalion. Communication personnel necessary to operate the batterys' radio sets are found in the

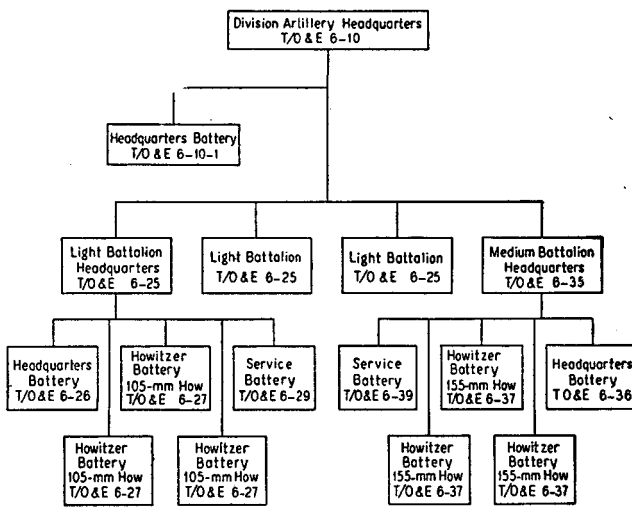


Figure 27. Organization of division artillery.

headquarters battery of each battalion. Each howitzer battery consists of the battery detail (which includes a communication section), the firing battery (four or six howitzers), and the maintenance section. For details see appropriate tables of organization and equipment.

b. Communication officers command the division artillery headquarters battery and the headquarters batteries of light and medium field artillery battalions. The communication officer, in addition, performs duties similar to those for the division signal officer with respect to the communication personnel of his own and subordinate units. (See par. 7b.)

100. DIVISION ARTILLERY HEADQUARTERS BATTERY. a. Wire. Division artillery headquarters battery is provided with W-110 wire and W-130 wire to maintain communication with all subordinate headquarters. Switchboards equipped with repeating coils allow the addition of simplexed telegraph circuits to each battalion.

b. Radio. (1) Frequency modulated (FM) radio equipment with a rated range of 5 to 15 miles is allotted in sufficient quantity to maintain communication between the commander, his executive, and the commanders and staffs of subordinate units.

(2) The division artillery commander and executive officer have FM radio sets designed to permit operation on several preset channels. This allows communication with all elements of the command and higher units. This constitutes the control net.

(3) Amplitude modulated (AM) radio sets with a rated range of 30 miles for CW operation and 15 miles for voice operation are provided for operation in a command net with subordinate battalions. This net is operated normally on CW, handles administrative traffic, and constitutes the command net.

(4) An additional AM radio set is provided for communication with the division command post as required.

(5) An AM radio set with rated range of 60 miles for CW operation, 40 miles for tone, and 20 miles for voice, is provided for operation with corps artillery.

(6) All radio equipment in division artillery headquarters battery is vehicular-mounted and capable of mobile operation. Sets used in the division artillery command net are capable of ground operation.

101. LIGHT FIELD ARTILLERY BATTALION. a. Command post location. The battalion command post of a field artillery battalion supporting an infantry regiment should be located adjacent to the infantry command post initially and its location coordinated with the infantry; as the action progresses the artillery battalion command post may not move each time that the infantry command post moves but will maintain communication with it and will again be located adjacent to the infantry command post as early as practicable.

b. Wire. Each battalion headquarters battery is provided with W-110 and W-130 wire and each howitzer battery with W-130 wire in sufficient quantity to establish and maintain telephone communication betweeen all units of the command. Switchboards equipped with repeating coils allow the addition of simplexed telephone circuits. These circuits are used within the battalion for additional telephone circuits between the fire-direction center and howitzer positions.

c. Radio. (1) Each battalion is allotted FM radio equipment with a rated range of 5 to 15 miles to maintain communication between the commander, his executive, certain members of his staff, and all major installations of the batteries.

(2) The battalion commander and executive officer have FM radio sets designed to permit operation on a number of preset channels. This allows communication with all elements of the command and with adjacent and higher units.

(3) Battery commanders, battery executive officers, liaison officers, forward observers, and the fire-direction center are provided with FM radio sets with a rated range of 5 miles and preset for two-channel operation. One channel is reserved for fire-direction center operation and the other for operation in the battalion control net. Either channel

may be used as an alternate for the other when congestion or jamming occurs.

(4) Additional AM radio sets are provided for operation in the division artillery command net, and under certain conditions, may be operated in the infantry regimental command net.

(5) An AM radio set with a rated range of 60 miles for CW operation, 40 miles for tone, and 20 miles for voice, is provided for operation with corps artillery.

(6) All radio equipment of the battalion is vehicular-mounted and capable of mobile operation. All sets, except those of the battalion commander and executive officer may be operated as ground sets.

102. MEDIUM FIELD ARTILLERY BATTALION. Signal equipment of the medium field artillery battalion is similar to that of the light field artillery battalion. Fewer radios and less wire equipment are issued to medium field artillery battalions because of reduced liaison personnel.

103. ARTILLERY LIAISON AIRPLANES. Each artillery liaison airplane is equipped with an FM radio set with a rated range of 5 miles for communication with the unit's fire-direction center. Normally the radio is preset for operation on the control channel of the parent unit and on the control channel of the superior unit. (See figs. 28 and 29.)

104. OPERATIONS. Communication systems in the field artillery serve four major purposes: (1) command, (2) liaison, (3) fire control, and (4) administration.

a. Command. The primary function of communication is to provide a commander with a means of controlling his unit.

b. Liaison. A means of communication must be established with supported infantry units and with artillery liaison officers. These are extremely important communication channels; without them field artillery could not adequately perform its mission.

c. **Fire control.** Communication must be available between all artillery observers, fire-direction center, and howitzer batteries.

d. **Administration.** A communication channel must be available between all echelons of field artillery for administrative purposes. This channel is normally wire telegraph or radio telegraph.

105. COMMUNICATION SYSTEMS. a. **Radio systems.** (See figs. 28 to 32.)

b. **Basic wire system.** (See fig. 33.)

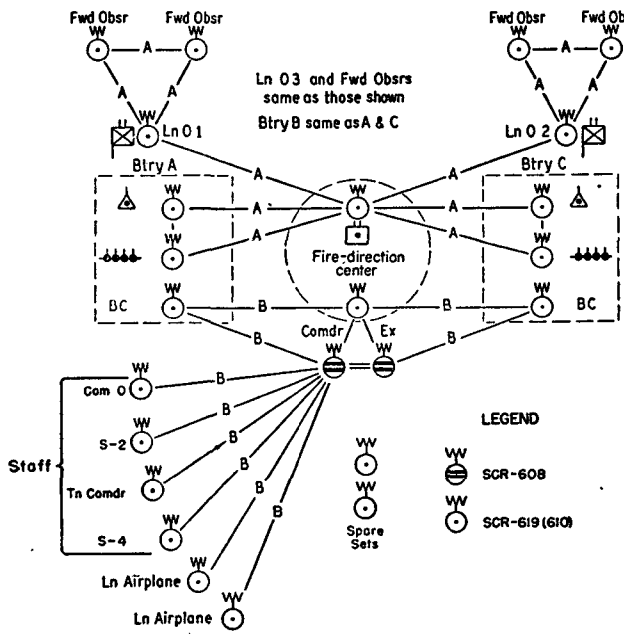


Figure 28. Field artillery battalion FM radio system (with only two channels available).

NOTES

1. Each field artillery battalion is assigned two radio channels, "A" and "B." Channel "A" is used for battalion fire-direction

net; channel "B" is used for battalion control net. Each channel is an alternate for the other in case of congestion or jamming. Operation on an alternate channel must be restricted to emergencies only.

2. Forward observers from an attached unit operate in fire-direction and control nets of direct support artillery battalion. They observe for the direct support artillery battalion and report to its liaison officer for coordination, operating in the net with the liaison officer and the fire-direction centers.

3. When forward observers of reinforcing units operate in the zone of action of an infantry battalion, they coordinate their activities with liaison officers of the direct support artillery battalion but normally operate in fire-direction and control nets of their own battalion.

4. Observing personnel other than forward observers, operating and observing in the zone of action of an infantry battalion, operate in the fire-direction and control nets of their own battalions. They report to and coordinate their activities with the direct support artillery battalion but observe for their own battalion.

5. All radio sets of a battalion are preset to the battalion "A" and "B" channels, except those mounted in the liaison airplanes. See Note 6 below.

6. Normally radio sets mounted in liaison airplanes of a unit are preset to the control channel of that unit and to the control channel of the next superior unit.

7. The battalion commander's and executive officer's radio sets are preset to the "A" and "B" channels of all battalions of the division artillery, to the division artillery "D" channel, and to the corps artillery "C" channel. The battalion commander and executive listen on battalion "B" channel and division artillery "D" channel, monitoring "A" channel as required; they transmit on any of the present channels as required; but control the battalion primarily on "B" channel.

8. A reinforcing or attached unit provides a radio set at fire-direction center of reinforced or organic unit to operate in its own fire-direction and control nets.

9. Additional radio sets available in a unit are used for replacements, and to provide for special needs of liaison officers, forward observers, survey personnel, and relay stations.

10. When radio communication is necessary beyond the range of field artillery radio sets higher headquarters should be asked to furnish the radio sets with operators.

11. When additional radio channels are available to a battalion, individual channels may be assigned to howitzer batteries for battery fire-direction and control, provided a liaison officer and the forward observers controlled by him operate on the same channel, and all radio sets operate on a common channel.

12. The ¼-ton vehicle for the assistant S–2 is provided with a vehicular mount from one of the spare sets. This permits inter-

changeable use of the S–2 radio by both the S–2 and assistant S–2 as desired.

13. Although figure 28 indicates two forward observers controlled by each liaison officer, the number of forward observers employed is limited only by the situation, personnel, and equipment available.

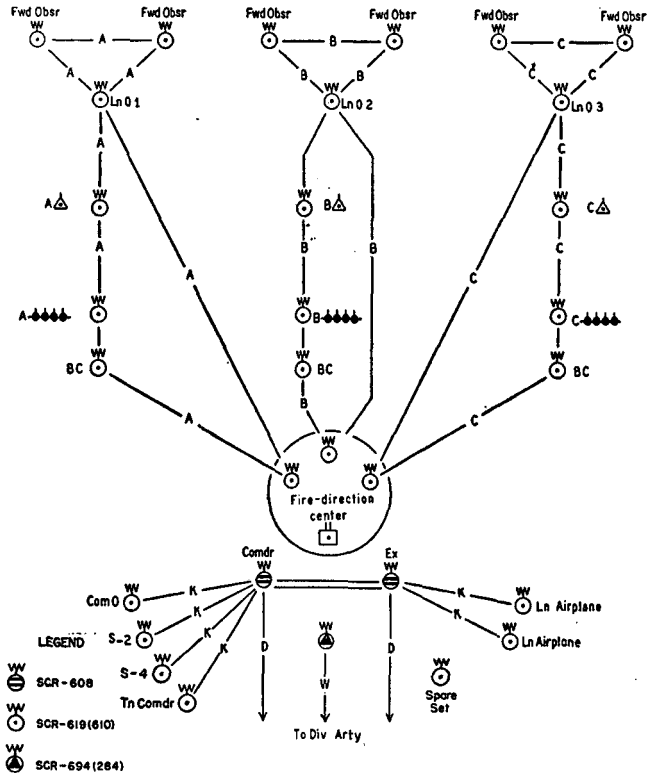


Figure 29. Field artillery battalion alternate FM radio system (when four channels are available).

NOTES

Although this diagram indicates two forward observers controlled by each liaison officer, the number of forward observers employed is limited only by the situation, personnel, and equipment available.

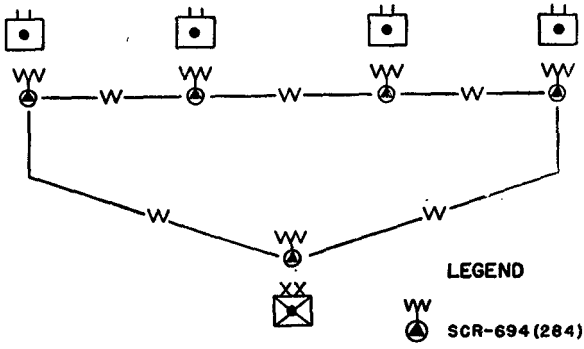


Figure 30. Division artillery command radio net.

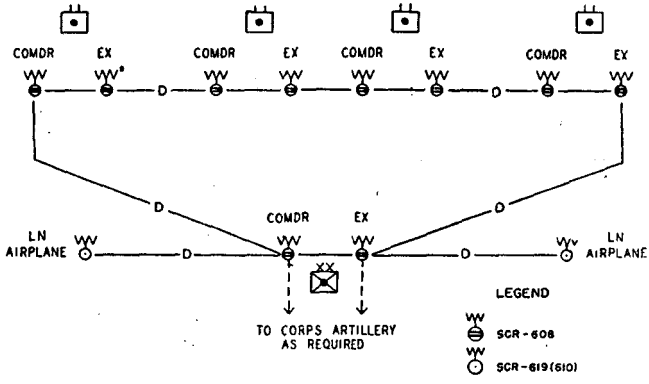


Figure 31. Division artillery control radio net.

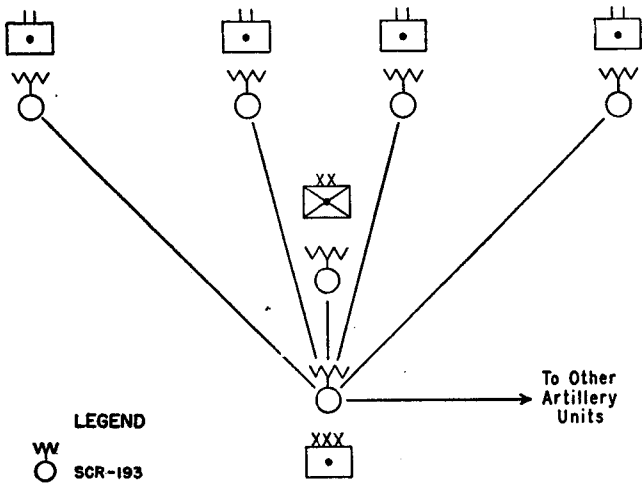


Figure 32. Corps artillery fire direction net.

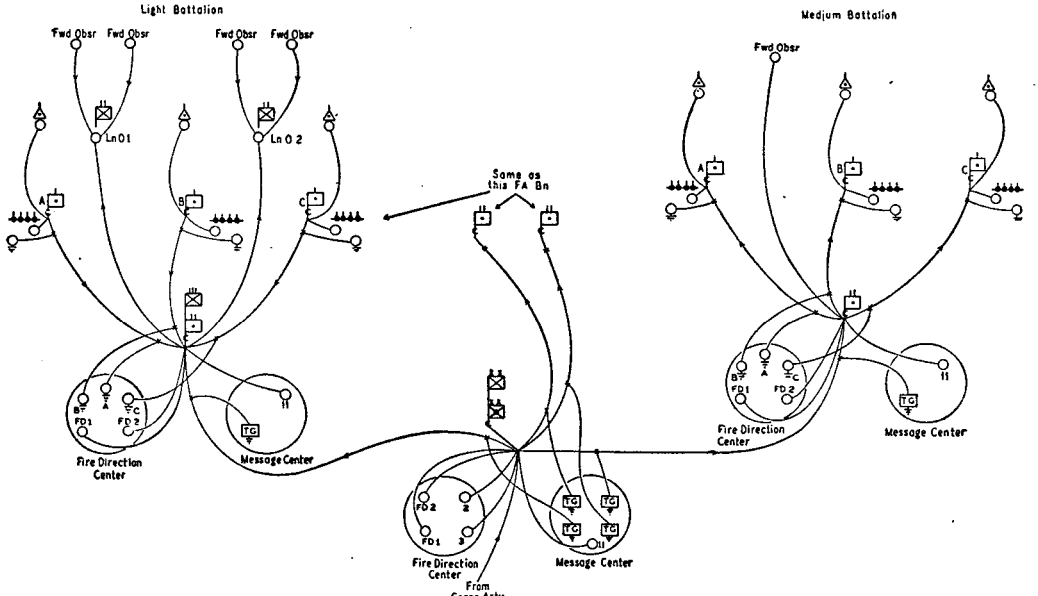


Figure 33. Artillery basic wire system.

NOTES

1. Wire circuits indicated are installed by field artillery units unless orders to the contrary are issued. Variations and additions thereto must be considered and covered in appropriate orders.

2. ——→ Arrow points away from the organization that usually installs the circuit. Responsibility for laying a circuit is not indicated.

3. Local telephone for battalion or higher unit commander is installed as directed.

4. Each field artillery battalion installs at least one wire circuit between its switchboard and the switchboard of the supported infantry regiment or reinforced artillery unit.

5. The division signal company installs two wire circuits between the division switchboard and the division artillery switchboard.

6. Two liaison officers are shown. When Liaison Officer 3 is committed, installations similiar to those shown for Liaison Officer 1 are made to him.

7. Group command post installations are similar to those shown for division artillery.

8. A field artillery battalion designated for counterbattery installs a metallic circuit direct to corps artillery fire-direction center.

9. Installation of additional circuits in notes 10 through 12 requires command decision.

10. Liaison officers controlling three or more forward observers usually require more than one wire circuit to battalion. Added flexibility may be obtained by installing a switchboard at the liaison officers' position.

11. An additional circuit to the supported infantry may be installed when it is necessary to provide adequate coordination between commanders and staffs.

12. When fire-direction is of primary importance, simplexed circuits may be used for ground-return telephone communication between fire-direction centers. Ground-return telephone in parallel with telegraph may be used as an expedient. Ground-return telephone communication is subject to interception and must be used for conduct of fire only. As soon as practicable, ground-return telephone circuits will be replaced by metallic circuits.

106. DISPLACEMENTS. a. Wire. When a displacement becomes necessary, it is desirable to have a wire net established in the new position area before the unit displaces. This will enable a unit or an element of that unit to commence firing promptly from its new position using wire communication. The extent of the wire net installed in the new position prior to displacement will depend on the

number of wire vehicles, communication personnel and equipment that the commander is allowed to take with him on reconnaissance. Proper arrangements must be made to include in the reconnaissance party vehicles, equipment, and personnel necessary to install wire in the new position. Sufficient men, vehicles, and equipment to operate the communication system and to recover the wire must remain in the old position. If possible, wire communication should be established between the old and the new position during displacement. In a forward displacement this is best accomplished by splicing into a liaison or forward observer line near the forward area. In a retrograde movement continuous wire communication is best obtained by utilization of existing lines previously laid. When the element at the old position displaces, it will arrange for recovering wire that remains in the old area.

b. Radio. (1) Upon receipt of the order to displace, liaison officers, forward observers, and elements remaining in the old position (second echelon), continue operation on channel "A" (fig. 28). Displacing elements (first echelon) shift to channel "B," displace, and open fire from the new position.

(2) When the first echelon is in its new position and ready to resume fire, a message directing the switching of frequencies and displacement of the second echelon is transmitted to both forward and rear elements. Upon receipt of this message, first echelon elements shift to channel "A"; liaison officers and forward observers continue operation on channel "A"; and the displacing elements shift to "B."

(3) When the second echelon is in the new position a message is sent to all elements to resume operation of radios in accordance with the basic system, at which time all elements resume operation on channel "A."

Section II. COMMUNICATION DURING A CONCENTRATION

107. ACTIVITIES. a. General. During the concentration period the primary concern of a force commander is prepa-

ration for contemplated operations. Training will be continued and intensified, equipment will be tested and repaired, and a minimum of communication will be provided for the coordination of activities of subordinate units.

b. Message center. Message centers will be established and operated by each headquarters. Messengers will be provided at each message center. Scheduled messenger service may be provided if the volume of message traffic warrants.

c. Radio. Radio stations will generally be silenced or restricted except for certain warning and reconnaissance nets which may be necessary.

d. Wire. Wire installations will be kept to a minimum within the concentration area. Full use will be made of existing commercial facilities.

108. PLANNING. a. Plans. All echelons will receive information concerning contemplated operations and will prepare their plans. Prearranged message codes will be prepared and distributed. Staff conferences will be held for coordination of effort.

b. Supply. All radio sets will be tuned and tested on channels prescribed by signal operation instructions for the operation planned. All communication equipment will be inspected thoroughly for operating condition and adequacy. Equipment shortages will be replenished.

c. Training. All unit training will continue without interruption, particular emphasis being placed on those subjects peculiar to the operation being planned.

Section III. COMMUNICATION DURING MARCHES AND AT HALTS

109. REQUIREMENTS. a. Tactical. During marches an artillery unit must provide itself with sufficient communication for column control, to maintain contact with artillery reconnaissance and security parties, and with supported and superior units.

b. Technical. Because radio communication may be denied at any time and wire communication is generally impracticable, full use must be made of other means of communication. Normally messengers will be employed between march units and within groups and serials of individual march units. To provide adequate messenger service the march must be so planned that messengers may be told the exact time and place to meet any headquarters.

110. ACTIVITIES. Unless radio communication is prohibited each artillery battalion will operate on its control channel. All vehicular radios will operate on this channel for rapid dissemination of information and orders. Each battalion commander will operate one receiver on the division artillery control channel. Liaison airplanes, artillery reconnaissance and security parties will maintain radio communication with marching columns.

Section IV. COMMUNICATION DURING DEVELOPMENT

111. AMPLIFICATION OF SYSTEM. a. Command post. When the force is developing a situation the artillery must be ready to provide continuous support. Artillery command posts are established for coordination of all artillery fire of the division. Communication will be maintained at all times between the command posts of the artillery and the supported unit.

b. Communication system. The communication nets of the battalions and of division artillery will be expanded to the wire and radio systems prescribed by the commander. Initially communication will be by radio and messenger. Wire communication will be provided as rapidly as practicable.

112. PREPARATION OF ACTION. Rapid preparation of the command for action during a development is essential. Artillery liaison and forward observer sections are instructed and return to their supported units. Meteorologi-

cal messages, warning orders, and other preparatory information must be delivered to the units as rapidly as possible. Registration and fire on targets of opportunity must be handled with speed. Every effort is devoted to developing communication necessary to accomplish the above.

113. **PRECAUTIONS.** Although speed is paramount during the development, signal security is vital. Unlimited radio traffic will give the enemy much information. Radio traffic must be held to a minimum. Messages sent by radio will be brief. Rules of cryptographic security will be observed, making full use of prearranged messages.

Section V. COMMUNICATION DURING THE ATTACK

114. **GENERAL.** Artillery positions in offensive combat are located well forward. A field artillery battalion usually occupies a position in the zone of attack of its supported unit. In a meeting engagement, artillery units not already in position must occupy positions promptly upon deployment of the infantry. Units already in position may have to be displaced forward to support the attack. In the attack of an organized position, the bulk of the artillery supports the main effort. (See FM 6–20.)

115. **ORGANIZATION OF COMMAND POST.** a. **General.** In the initial stage of a meeting engagement control of the artillery is of necessity decentralized. Centralized control develops as the situation stabilizes to give the force commander a mass of fire power with which to influence the action. In attack of an organized position, normally time is available to permit the more detailed command post installation necessary for maximum control.

b. **Organization.** To obtain centralized control, a completely organized artillery command post is composed of four installations: (1) fire-direction center, (2) message center, (3) switching central, and (4) radio and panel

station (figs. 34 to 36). Basic installations shown may be expanded readily into a more elaborate system. In addition to the radios shown, radios are mounted in the commander's

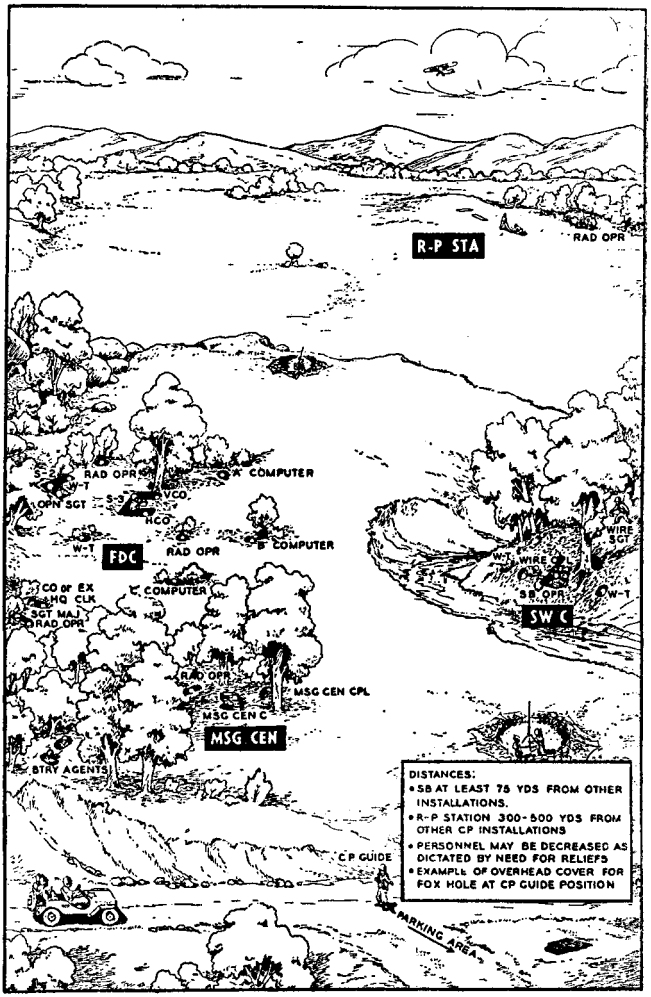


Figure 34. Elements of a field artillery battalion command post.

and the executive officer's cars of the division artillery and all battalions.

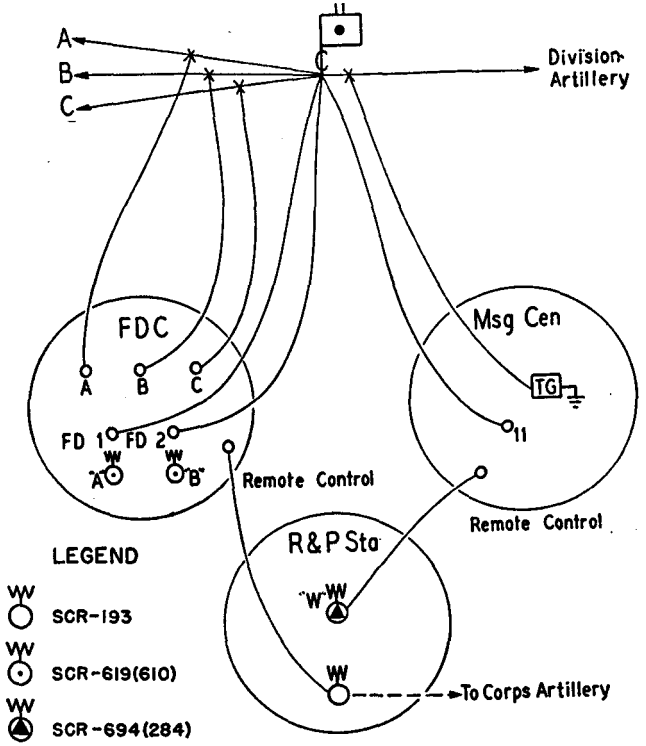


Figure 35. Communication diagram of a field artillery battalion command post.

NOTES

1. Distances:
   a. Switchboard to fire-direction center—75 to 100 yards.
   b. Message center to fire-direction center—50 to 70 yards.
   c. Fire-direction center to radio and panel station—300 to 500 yards.
2. Local telephone (No. 6) for the battalion commander is not shown on the diagram; it is installed as desired by the commander in each case.

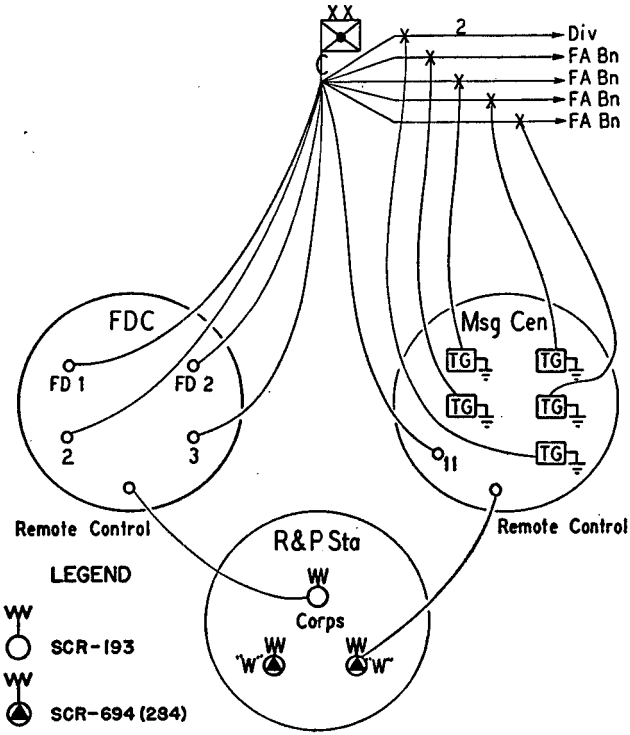


Figure 36. Communication diagram of division artillery command post.

NOTES

1. Distances:
   a. Switchboard to fire-direction center—75 to 100 yards.
   b. Message center to fire-direction center—50 to 75 yards.
   c. Fire-direction center to radio and panel station—300 to 500 yards.

2. Local telephone (No. 6) for the division artillery commander is not shown on the diagram; it is installed as desired by the commander in each case.

3. When fire direction is of primary importance simplexed circuits to battalions may be used for ground-return telephone communication between fire-direction centers of division artillery and battalions replacing telegraph circuits. Ground-return telephone

communication is subject to interception and must be used for conduct of fire only. Ground-return circuits should be replaced by metallic circuits as soon as practicable.

116. DISPLACEMENTS. a. Wire. The method of making a displacement whether it is in attack or in retrograde action, in which wire communication is utilized, follows the general plan outlined above. (Paragraph 106*a*).

b. Radio. Since displacement by echelon using only radio presents many difficulties, communication plans made prior to the attack must include the possibility that all means of communication other than radio may be temporarily impracticable. Radio sets must be so allocated that all persons capable of adjusting fire are netted on one radio channel (see par. 106*b*). Firing battery radio sets also must be capable of being netted with the battalion fire-direction center to provide continuous fire direction as individual batteries displace.

Section VI. COMMUNICATION DURING REORGANIZATION

117. COMMUNICATION DURING REORGANIZATION. a. General. After an attack has reached its objective or has been stopped short of the objective the force commander may decide to continue the attack, to withdraw, or to defend. In any event, forces are regrouped to fit the new scheme of maneuver. Communication systems may be reorganized and altered to fit new plans.

b. Maintenance of circuits. The reorganization phase is a critical one for artillery communication systems. Artillery support must be continuous to protect the supported units and assist in preventing counterattacks. Artillery communication officers must maintain existing communication systems and be prepared to extend or modify the systems as soon as a new decision is made. Radio nets continue in operation.

c. Redistribution of equipment. Communication officers must have signal equipment serviced and repaired in prepa-

ration for displacement. Salvage of signal equipment is necessary during the reorganization phase. Communication officers assist in redistribution of signal equipment within units.

Section VII. COMMUNICATION DURING PURSUIT

118. COMMUNICATION DURING PURSUIT. a. General. During pursuit artillery usually is attached to a unit or element making the pursuit. The communication system employed by artillery in an attack is basically the same regardless of the maneuver employed by the attacking force. In any scheme of maneuver maintenance of communication requires maximum effort by all communication personnel.

b. Command posts. Rapid movement in a pursuit will compel hurried and numerous displacements. Maintenance of contact between units and between a unit's advance and rear command posts requires message center personnel, messengers, communication personnel, and appropriate signal equipment at each installation.

c. Messengers. Messengers with transportation are established as needed at message centers. Liaison airplanes may be used for drop and pick-up service.

d. Radio. Radio will be used extensively by artillery employed in pursuit when radio silence is not imposed. Division artillery will maintain radio contact with battalions retained under centralized control. Within battalions the most suitable means of communication is radio. Rapid and numerous displacements call for continuous radio communication. When a field artillery unit displaces by echelon the first echelon includes radio sets for communication in command, fire-direction, and control radio nets.

e. Visual. Panels and pyrotechnics may be used in conjunction with liaison airplanes to maintain contact with artillery employed in pursuit missions.

f. Wire. During pursuit every effort will be made to maintain wire communication despite obvious difficulties.

When the situation requires, howitzer batteries will establish and maintain direct circuits from howitzer positions to fire-direction center. If practicable battalion wire personnel will maintain a circuit to a forward switching central along the axis of signal communication. When a forward switching central is established liaison officers and forward observers may establish circuits to it.

g. Signal supply. Communication officers will make every effort to have sufficient signal equipment available and in proper working order when pursuit is commenced.

Section VIII. COMMUNICATION DURING WITHDRAWAL AND IN A DELAYING ACTION

119. ESTABLISHMENT OF BASIC SYSTEMS. a. General. Communication during a withdrawal follows, in most instances, procedure similar to that employed in forward displacements.

b. Communication officer. The division artillery communication officer must obtain early information regarding routes of withdrawal together with axes of existing signal communication. The communication officer must be prepared to recommend use of existing wire circuits to increase the efficiency of communication during the withdrawal. With receipt of early information on the plan of withdrawal, plans for the communication system to be used by the units of the division artillery are made. Such plans should entail the following:

(1) Strict regulation of radio operation which may include silencing of certain stations or establishing dummy stations as needed for deception.

(2) A plan for the most effective use of existing wire circuits.

c. Signal Communication. (1) Communication personnel continue operation of existing systems while preparing for displacement of command post installations, liaison and forward observer, and battery wire circuits. When practicable, existing circuits will be spliced to new circuits.

(2) Wire circuits not required by units should be removed.

(3) Normal radio operation is continued during the initial phase of withdrawal. A message center will be established at the rear command post and contact must be maintained between the two command posts at all times. In addition to wire circuits between command posts, battalions and division artillery units may establish an additional radio net as an alternate means of communication between command posts.

120. DISPLACEMENTS. The method of making a displacement to the rear, in which radio or wire communication, or both, are utilized is outlined above. (See pars. 106 and 116.)

Section IX. COMMUNICATION DURING THE DEFENSIVE

121. SYSTEMS EMPLOYED. In a prepared defense sufficient time is available for installation of the basic wire system, and in addition, alternate and supplemental circuits. Radio is not employed initially but all stations are established and listen in continuously. Uninterrupted wire communication must be provided for liaison officers and forward observers. Forward observers should splice into the liaison circuit as far to the rear as time and equipment will permit to prevent interruption of communication by cutting and resplicing when forced to withdraw. Forward observers usually splice into the liaison circuit at different places to avoid communication interruption. Lateral circuits may be established between liaison officers to provide an additional circuit for emergencies. Lateral circuits between artillery battalions and batteries are normally established. Alternate circuits are laid along different routes. Permission to use commercial circuits or other circuits already in existence is obtained from the division signal officer. Where practicable wire is laid to alternate positions to facilitate early action when these positions are occupied.

122. **PROTECTION.** Particular attention must be given to maintenance and improvement of wire circuits in the planning and installation phases. Wire routes which afford maximum natural cover are selected at the expense of shorter routes. Initially, wire is installed with great care; improvement of the wire net thereafter is continuous. (See FM 24–20.) When an enemy uses infiltration tactics, line guards are posted in concealed positions along wire routes. Personnel and equipment must be available to repair promptly damages to wire lines, especially that sustained during hostile artillery preparation.

Section X. COMMUNICATION FOR OTHER TACTICAL OPERATIONS

123. **DECENTRALIZED OPERATION.** a. When an artillery battalion functions as a part of a combat team, the battalion commander is the artillery officer on the staff of the infantry regimental commander. As such, his duties are comparable to those of the division artillery commander when the battalion is operating under centralized control.

b. Methods of employment of communication systems within the battalion are identical to those used when operating under centralized control.

124. **SPECIAL SITUATIONS.** Prior planning for special situations, such as an amphibious operation, may result in separate battalions being allotted four frequency modulated channels for operation, in addition to the usual channel for ship to shore control. Plans for suballotment of these channels may be as shown in figure 29. The radio set used for communication with division artillery may be used for ship to shore communication.

125. **ATTACHED ARTILLERY.** a. When armored artillery, and tank or tank destroyer units are employed on a secondary mission as reinforcing artillery, liaison will be established with the reinforced unit by the reinforcing unit. Wire communication between the fire-direction centers is

established by the reinforced unit and becomes the primary means of communication between the reinforcing and reinforced units.

b. Radio communication is considered as a secondary means of intercommunication between armored or tank destroyer units, and the reinforced battalion. When special situations dictate the use of radio, communication will be established by providing an exchange of liaison officers with radio equipment and operators. Such sets remain preset to the frequency of their parent unit. This exchange will provide intercommunication between fire-direction centers and, in addition, provide channels whereby forward observers may transmit fire missions directly to one or both of the fire-direction centers.

126. **TRUCK DRAWN ARTILLERY SUPPORTING TANK UNITS.** When truck drawn artillery supports a tank unit there are a number of methods by which radio communication may be obtained.

a. The headquarters company of certain tank battalions have a tank equipped with an SCR–608. This tank is available for one of the artillery forward observers. In this case communication with the fire direction center will be on the regular field artillery channel (Channels A or B, figs. 28 and 29), while communication with the tank unit can be provided by using a channel in the overlapping band of SCR–508 and the SCR–608 (see fig. 43). A receiver in the forward observer's tank will be on each of these channels. The artillery liaison officer and the other forward observer continue to use their regularly assigned radio sets and channels.

b. When it is necessary to place the artillery forward observer in a tank not equipped with an SCR–608, there are two methods by which fire direction radio communication can be obtained.

(1) The tank unit may send a tank radio set to the artillery fire direction center. A tank channel is then assigned for use between the forward observer and the fire direction center.

(2) A special channel in the overlapping band may be used between the forward observer and the fire direction center.

(3) In either (1) or (2) above communication between the forward observer and the tank unit can be provided by using a tank channel. The liaison officer and the other forward observer can continue to use their regularly assigned channels.

CHAPTER 5

ENGINEER BATTALION

Section I. COMMAND AND ORGANIZATION

127. GENERAL. The engineer combat battalion is the engineer component of the infantry division. Its operations within the division are detailed in FM 5–6, its organization and duties in FM 5–5. This chapter outlines the battalion's signal communication activities.

128. EQUIPMENT AND TRANSPORTATION. a. Equipment. The authorized equipment permits accomplishment of the battalion's normal missions; see current Tables of Organization and Equipment 5–15, 5–16, and 5–17. Additional equipment may have to be obtained from higher headquarters when the battalion or its elements are assigned special missions.

b. Transportation. Organic transportation moves engineer signal equipment and personnel.

129. ORGANIZATION. a. Personnel. Personnel to operate the battalion's signal agencies are listed in Tables of Organization and Equipment 5–15, 5–16, and 5–17. Additional personnel is frequently required for such duties as switchboard operators, code clerks, message-center clerks, and field linemen.

b. Signal agencies. The battalion is organized to operate and maintain the following signal agencies:

(1) *Messenger communication.* Messenger communication is by dismounted and motor messengers.

(2) *Wire communication.* Elements of the battalion employ wire communication for controlling traffic at work sites, bridges, and other suitable situations. To a lesser extent wire communication is used for tactical control.

(3) *Radio communication.* Radio communication is used extensively in battalion tactical operations.

(4) *Visual communication.* Visual communication is used to a limited extent. The means include panel sets, pyrotechnics, smoke signals, flags, and hand signals.

(5) *Interarm communication.* Messengers are the principal means of signal communication between engineers and units to which they are attached or in support; other means such as radio, wire, pyrotechnics, or flags are employed under suitable conditions.

130. BATTALION HEADQUARTERS. a. General. Battalion headquarters is organized to operate and maintain communication with the division command post and with subordinate units of the battalion.

b. Command post. The battalion command post is normally in the vicinity of the division command post except when the battalion is committed to combat as infantry.

c. Message center. Battalion message center personnel include the following:

Communication chief.
Radio operators.
Messengers.
Additional personnel as required.

d. Communication chief. The communication chief is the battalion message center chief. He assists the communication officer in supervising the communication of the battalion.

e. Radio operators. Radio operators are assigned to the command radios and the reconnaissance radios. In addition to operating radios, they perform other communication duties such as code clerks or wire linemen.

f. Reconnaissance section. The reconnaissance section of headquarters and service company maintains communica-

tion with battalion headquarters when operating on an assigned mission.

131. HEADQUARTERS AND SERVICE COMPANY. a. General. Headquarters and service company administers and quarters communication personnel operating at battalion headquarters. Company headquarters operates its own message center consisting of message center chief and messengers.

b. Repair. The battalion repairs its signal equipment within the capabilities of the assigned radio repairman, spare parts, and authorized tools in headquarters and service company. Equipment requiring higher echelon maintenance is sent to the division signal company.

132. LETTERED COMPANY. In the lettered companies, the first sergeant is the message center chief, but his communication duties are usually performed by the senior radio technician on duty. Radio operators are assigned to the company headquarters radio set. Messengers are drawn as needed from company personnel.

133. TRAFFIC PRIORITY. Traffic priority for communication vehicles is prescribed in the division SOP. (See par. 16.)

134. SIGNAL OPERATION INSTRUCTIONS (SOI). The battalion does not issue SOI; it extracts applicable material from the division SOI and passes this information down to the elements and subordinate units concerned.

135. STANDING OPERATING PROCEDURE (SOP). Applicable material of the division signal SOP is incorporated in the battalion SOP.

Section II. COMMUNICATION DURING A CONCENTRATION

136. ACTIONS INVOLVED. See FM 100–15 for the general outline of normal duties and actions of division

engineers prior to and during the division's arrival at a concentration area.

137. PLANNING FOR COMMUNICATION. The communication planning outlined for the division signal company personnel, paragraph 21, applies generally to the engineer battalion communication personnel.

138. COMMUNICATION ACTIVITIES DURING CONCENTRATION PERIOD. During this period, engineer communication personnel are engaged in operating and maintaining the battalion signal agencies to insure adequate communication between working elements, the company and battalion headquarters.

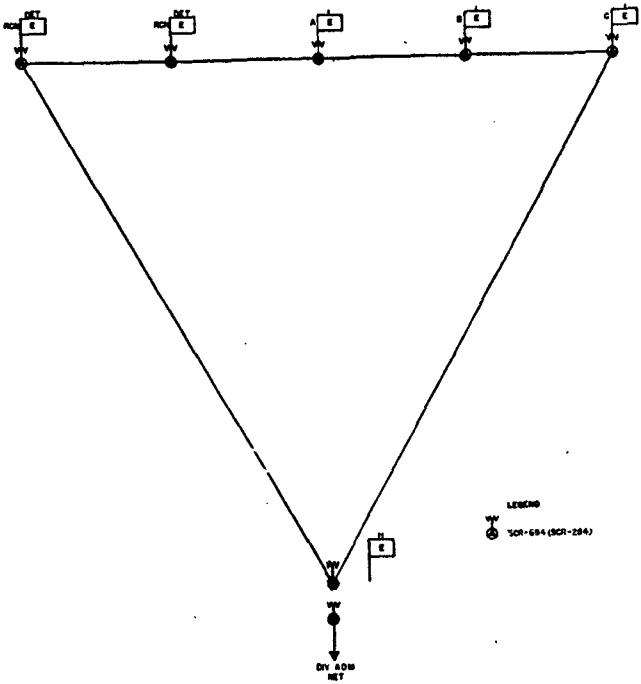


Figure 37. Engineer combat battalion radio net. This is the basic radio system used for many engineer missions.

139. COMMUNICATION AGENCIES USED DURING CONCENTRATION. a. Messengers. Messengers are provided at each message center and at division engineer section in division headquarters. The communication officer determines the need for scheduled messenger service.

b. Radio nets. Radio communication is covered generally in FM 24–18 and radio procedure is prescribed in FM 24–6, 24–9, 24–10 and TM 11–454. The battalion radio system provides the commander with communication facilities for control, administration, and reconnaissance and for communication with division. A combat-battalion radio net is shown in figure 37.

c. Wire. See paragraph 23*e*. A suggested battalion wire net is shown in figure 38. Each lettered company is equipped with sound-powered telephones. In addition, headquarters and service company may issue Telephones EE–8 to lettered companies for use in special missions. (See fig. 39.)

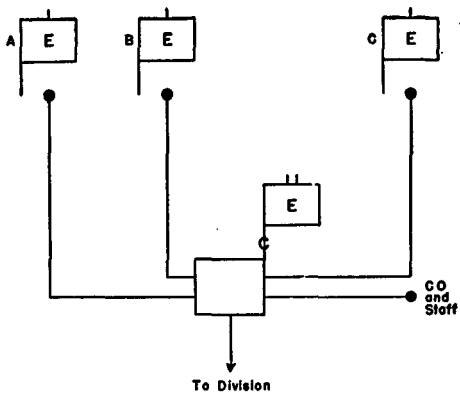


Figure 38. Suggested combat battalion telephone system.

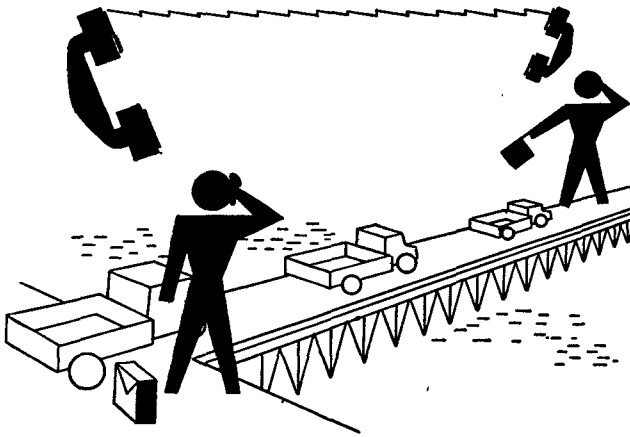


Figure 39. Simple telephone system adaptable to signal communication at work sites, bridges, obstacles, water points, and other situations requiring control of movement of troops or vehicles; sound-powered telephones will be used for such applications.

Section III. COMMUNICATION DURING MARCHES AND AT HALTS

140. GENERAL. a. Combat team. During division marches elements of the engineer battalion are attached to infantry regiments to form combat teams. The engineer component of the combat team normally consists of one platoon, each lettered company providing one such platoon. (FM 5–6.)

b. Engineer battalion. The engineer battalion less attachments moves as part of the division troops.

141. COMMUNICATION OF ENGINEER PLATOON WITHIN COMBAT TEAM. a. Contact. Necessary contact between an engineer component and its engineer headquarters is maintained through the combat team message center.

b. Messengers. Messengers are the principal means of communication with the combat team commander.

c. **Signal equipment.** The engineer platoon is not issued radio or wire equipment.

142. **COMMUNICATION DURING MOVEMENT OF ENGINEER BATTALION.** a. **General.** Because of the number of engineer missions carried on concurrently with the division movement, communication organization during this period cannot be specifically outlined. In general, provisions of sections I and II (this chapter) and section II (chap. 2) apply continuously during the movement even when special situations absorb all but one or two platoons of the engineer battalion.

b. **Reconnaissance section.** Radio sets of the reconnaissance section normally operate in the engineer battalion net. However, when out of range of the battalion radio net they may employ division communication facilities; the division engineer then controls the section through the division message center.

Section IV. COMMUNICATION DURING DEVELOPMENT

143. **TACTICAL OPERATION.** During the division development operation, engineer elements may support or be attached to division elements.

144. **COMMAND POSTS.** a. **Battalion.** The battalion command post is established near the division command post.

b. **Subordinate elements.** (1) The headquarters and service company command post is ordinarily located near the battalion command post.

(2) Battalion working elements in support of division elements establish their command post near those of the elements they support.

(3) Remaining elements of the engineer battalion usually locate their command posts within the battalion assembly area.

145. COMMUNICATION DURING DEVELOPMENT. a. General. See section II of this chapter.

b. Reconnaissance section. See paragraph 142 for discussion of the communication activities of the reconnaissance section.

Section V. COMMUNICATION DURING THE ATTACK

146. TACTICAL OPERATION. Engineer units are assigned to support elements of the division in the attack. (See FM 5–6).

147. COMMUNICATION DURING ATTACK. The general provisions of section V, chapter 2, apply to engineer communication operations during this period. Reference to signal orders and instructions therein must be interpreted according to the SOI and SOP outlined in Section I of this chapter. Use of the radio and wire nets discussed in Section I of this chapter depends on the situation.

148. SPECIAL COMMUNICATION DURING ATTACK. When obstacles must be overcome, engineers assist the infantry advance. An example is the passage through a mine field. The traffic control plan used for this operation and its principal radio nets is explained and illustrated in FM 5–31.

Section VI. COMMUNICATION DURING REORGANIZATION

149. GENERAL. a. See paragraph 45 for general scope of division activities during reorganization. The reorganization described therein does not apply to the engineer battalion employed in engineer missions. Reorganization of

the battalion for combat as infantry is fully covered in section X of this chapter.

b. Changes made in the battalion signal system depend on the division commander's plan of future action as discussed below.

150. COMMAND POSTS. a. If attack is renewed. Command posts are established as outlined in paragraph 147 if the attack is to be renewed.

b. If withdrawal is ordered. See section VIII of this chapter for action during a withdrawal.

c. If defense is ordered. See section IX of this chapter for procedure in the defense.

151. COMMUNICATION DURING REORGANIZATION. Communication within the battalion and its elements during reorganization of the division continues as outlined in section II of this chapter.

Section VII. COMMUNICATION DURING PURSUIT

152. GENERAL (par. 49). During a pursuit, engineer elements are employed to support the direct pressure force of the division (similar to employment during attack) and are attached to the encircling force (similar to employment during advance). (See FM 5–6.)

153. SIGNAL COMMUNICATION DURING PURSUIT. a. General. See paragraph 50 for general considerations of signal communication during a pursuit.

b. Within supporting elements. See section V for outline of signal communication within engineer supporting elements.

c. Within attached elements. See section III for outline of signal communication within engineer attached elements.

d. Within reconnaissance section. See paragraph 142b.

Section VIII. COMMUNICATION DURING WITHDRAWAL AND IN A DELAYING ACTION

154. COMMUNICATION IN WITHDRAWAL FROM ACTION. a. Tactical operations. Engineers may be attached, in support, or detached during the withdrawal. See FM 5–6 for operations of engineer elements during this phase.

b. Engineer communication. Since engineer elements assisting units of other arms are usually attached to those units, tactical control of communication passes to the unit commanders. (See par. 141.) Some engineers are held under direct control of the division engineer (FM 5–6) who controls communication with such elements.

155. COMMUNICATION IN DELAYING ACTION. a. Tactical operations. See FM 5–6 for engineer tactical operations during a delaying action.

b. Contact. Necessary contact between an engineer component and its engineer headquarters is maintained through the detachment message center.

c. Messengers. Messengers are the principal means of communication from engineer component to the detachment.

Section IX. COMMUNICATION DURING THE DEFENSIVE

156. DEFENSIVE POSITION. In the defense, engineer elements normally support division elements. Reorganization for combat as infantry may be directed by division commander at this phase (section X of this chapter).

157. COMMUNICATION SYSTEM. See paragraph 55 for general communication considerations in this phase. See section V of this chapter for general provisions governing the engineer communication system.

158. COMMUNICATION FOR THE DEFENSE. a. Message centers. During the defense, message centers are

established initially at the battalion command post but are prepared for displacement to the rear area of the division and immediate operation there.

b. Messengers. See paragraph 57c for messenger operation.

c. Battalion radio net. The battalion operates a radio in the division administrative net. (See figs. 5 and 37.)

d. Battalion reconnaissance section. The battalion reconnaissance section radios normally operate in the battalion command net.

e. Other agencies. See paragraph 57f and g for general considerations governing other agencies.

159. COMMUNICATION DURING CONDUCT OF DEFENSE. a. Tactical operations of engineers. During conduct of the defense, engineer units initially placed in support of, or attached to, units of other arms normally are withdrawn. The battalion then is assigned responsibility for engineer work in subdivisions of the rear area.

b. Communication. See section I and II of this chapter for communication operations in this phase.

c. Battalion reconnaissance section. The battalion reconnaissance radios normally operate in the battalion command net during this period.

160. COMMUNICATION IN THE COUNTEROFFENSIVE. Dispositions of engineer units are similar to those in the attack. (See section V for communication operations.)

Section X. COMMUNICATION FOR OTHER TACTICAL OPERATIONS

161. REORGANIZATION FOR COMBAT. a. General. Combat operations of the engineer combat battalion and its component units are the same as for corresponding infantry units (FM 5–6).

b. When effected. Reorganization of the company and

battalion for combat as infantry is initiated when specifically directed by appropriate commanders.

162. LETTERED COMPANY. a. Scope of reorganization. The company is reorganized to provide the following:

(1) Forward echelon:

(*a*) Company headquarters.
(*b*) Machine gun platoon.
(*c*) Three rifle platoons.

(2) Rear echelon:

(*a*) Transportation group.
(*b*) Supply and administration group.

b. Scope of signal communication. (1) *General.* The lettered company retains its organic signal equipment. In addition, each company is issued the Telephone EE–8.

(2) *Forward echelon.* A command post including a message center is established at each company headquarters.

(3) *Rear echelon.* Lettered company rear echelon is made a part of the battalion rear echelon and its command post uses the message center agencies of the battalion rear echelon.

163. THE BATTALION. a. Scope of reorganization. The battalion is reorganized to provide the following:

(1) Forward echelon:

(*a*) Battalion headquarters.
(*b*) Three companies.

(2) Rear echelon:

(*a*) Headquarters and service company.
(*b*) Rear echelons of lettered companies.

b. Scope of signal communication. (1) *General. The* battalion forward echelon maintains communication with division headquarters and adjacent units and organizes and maintains communication with the lettered companies.

(2) *Command posts.* The forward echelon command post is established near the reserve lettered company. The rear echelon command post is established at headquarters and service company headquarters.

(3) *Message center.* The battalion headquarters message center is normally divided into forward and rear echelon sections.

(4) *Radio net.* See figure 40 for radio nets used. The extra reconnaissance radio may be used as a rover by the commander or by the intelligence section of battalion headquarters.

(5) *Wire.* Assault and field wire is kept at headquarters and service company and issued as needed.

(6) *Switchboard.* The switchboard is located at the forward echelon of the command post. Lines from the division and adjacent units terminate at this board.

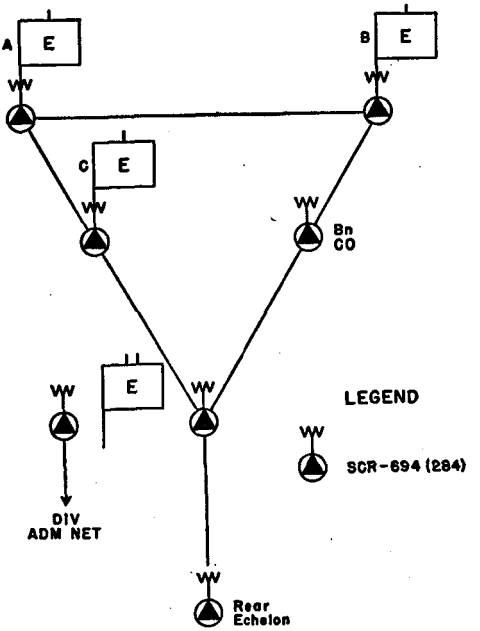


Figure 40. Typical radio net used when engineers are reorganized as infantry.

CHAPTER 6

CAVALRY RECONNAISSANCE TROOP, MECHANIZED

Section I. GENERAL

164. **ORGANIZATION.** a. The reconnaissance troop of the infantry division is the mobile reconnaissance agency available to the division commander, and is employed by him in accordance with the procedure prescribed in FM 2–20. Radio is the principal means by which information is transmitted to the division commander.

b. For detailed organization and equipment of the cavalry reconnaissance troop, mechanized, see current Tables of Organization and Equipment 2–27. The equipment and organization discussed in paragraphs 165 and 167 are based on tables dated 15 July 1943, including change 1 dated 15 September 1943 and change 2 dated 6 July 1944, and may be used as a guide.

c. The cavalry reconnaissance troop, mechanized, is organized into a troop headquarters and three reconnaissance platoons. Each reconnaissance platoon normally operates as three reconnaissance teams. Figure 41 illustrates a normal organization for the cavalry reconnaissance troop, mechanized, showing distribution of vehicles, radios and communication personnel.

165. **EQUIPMENT.** a. **Radio.** The reconnaissance troop is provided with both amplitude modulated and frequency modulated radio sets. The amplitude modulated radios (SCR–506) are available for long range communication

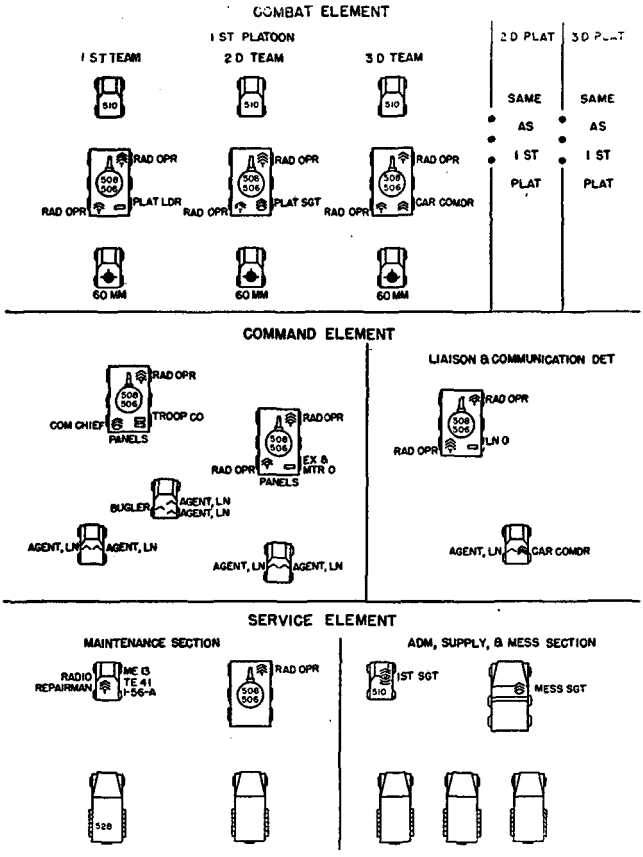


Figure 41. Communication personnel and equipment in a Cavalry Reconnaissance Troop, Mechanized.

while the frequency modulated sets (SCR–508, SCR–510 and SCR–528) are used for shorter range communication. Figure 43 gives the frequency coverage of these radio sets. Interphone equipment is provided for communication between the occupants of the armored car.

b. Tool and test equipment. The radio electrician is

equipped with tools and equipment to test tubes, install and make minor repairs to all radio sets, and accurately tune all frequency modulated radios.

c. **Frequency meter.** One Frequency Meter Set SCR–211 is provided per reconnaissance troop, permitting the accurate calibration of radio sets.

d. **Sound-powered telephones.** Sound-Powered Telephones CE–11 and light weight wire are provided for use by the reconnaissance troop.

e. **Panels.** Panel Sets, AP–30–C and D, one white for use on vegetation and one black for use on snow or sand, are provided for air-ground liaison between troop headquarters and any supporting reconnaissance aircraft. Panel Sets AP–50–A are issued for air-ground recognition.

f. **Flag sets.** Flag Sets M–238 are provided for signaling between vehicles.

166. **PERSONNEL. a. Liaison officer.** The liaison officer normally represents the troop commander at division headquarters, or wherever the division commander may be. It is his duty to transmit to the troop commander important friendly and enemy information, information concerning pending operations of the division, and to keep the division commander informed of the enemy information secured by the troop. For the transmission of information and orders, the liaison officer has at his disposal the SCR–506 and the SCR–508 in his armored car and one liaison agent with a ¼-ton truck. The liaison officer will make frequent visits to the troop command post to exchange detailed information and to deliver orders. In the absence of the liaison officer from the division command post, the sergeant car commander will represent the troop commander, and therefore must be well trained in the employment of the troop and in the communication agencies employed therein.

b. **Communication officer.** Although no communication officer as such is organically assigned to the reconnaissance troop, an officer, normally the liaison officer, must be assigned that duty in addition to his other duties. Within the troop, the communication officer is responsible to the troop

commander for the efficient operation of the communication system, and performs the following duties:

(1) Supervises the supply, installation, and maintenance of signal equipment.

(2) Prepares the SOP for communication procedures.

(3) Prepares and distributes necessary extracts from the division SOI.

(4) Prepares prearranged codes. (See par. 8b.)

(5) Supervises the training of communication personnel in communication subjects.

c. Communication chief. The primary duty of the communication chief is to provide communication and to carry out the orders of the communication officer. The communication chief must be carefully selected, well trained, and possess essential aptitude, initiative, and leadership ability.

d. Radio operators. There are several radio operator-assistant drivers and radio operator-gunners in the reconnaissance troop. The radio operator plays such an important part in the accomplishment of cavalry missions that his training must be of the highest type. He must be well trained in the operation and maintenance of his radio equipment, in radio procedure, communication security, cryptography, and in the frequency alignment of the frequency modulated sets of the troop.

e. Liaison agents. Of the seven liaison agents in the reconnaissance troop, six are in the command element and one in the liaison detachment. For liaison and messenger service, four ¼-ton trucks are provided, three being assigned to the command element and the other to the liaison detachment.

f. Radio electrician. The radio electrician will work with the motor maintenance section in performing preventive maintenance and making periodic technical inspections. He will perform such second echelon repairs as his technical ability and equipment permits, and will work in close cooperation with the division signal company radio repair section for authorized repairs and replacement of parts.

167. ORGANIZATION OF COMMUNICATION. a. Amplitude modulated radio nets. (1) *Troop command*

net. The troop command net (fig. 42) is composed of the SCR–506 radio sets of the armored car commanders in the three reconnaissance platoons, the armored car commander of the motor maintenance section, and the troop commander. It is employed for long range radio communication. Usually a reconnaissance platoon acts as a unit and only the platoon leader's transmitter operates. The other two platoon sets are listening stations until one or both are given a separate mission, at which time they will become transmitting stations. The motor maintenance station will frequently be with the troop command post and therefore will be an intermittent transmitting station. Although there are eleven stations in the amplitude modulated command net, there will usually be only four transmitting.

(2) *Division reconnaissance net.* The division reconnaissance net (fig. 42) is composed of the division net control station, the troop executive officer, the liaison officer, and any other reconnaissance agencies designated by the division commander. Because the liaison officer will frequently be at the division advanced command post with the commanding general, this net provides simultaneous communication with both the division forward echelon and the advanced command post.

(3) *Special nets for liaison officers.* The liaison officer may operate as a listening station in either the division reconnaissance net or in the troop command net. A parallel net from the liaison officer to the troop maintenance section may be established as a supplementary net when the motor maintenance armored car is present at the troop command post.

b. Frequency modulated radio nets. (1) *Platoon nets.* (See fig. 42.) Each platoon must be assigned a platoon channel for its FM radio net. This net is the platoon command net for the transmission of information and orders within the platoon.

(2) *Troop service net.* This net, consists of the troop commander, the executive officer and all radio sets with motor maintenance; it may also include the first sergeant or a radio set with radio maintenance. It is used for administrative purposes at close range and for column control on

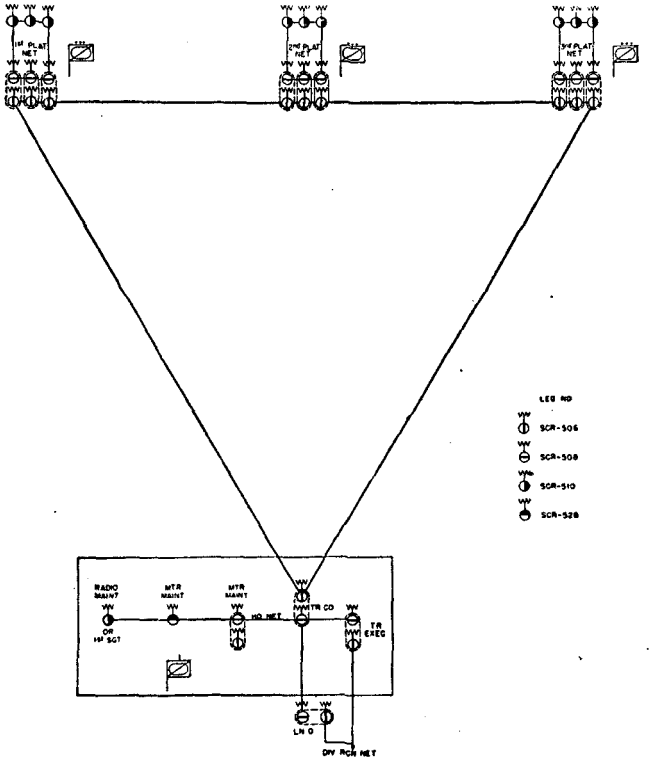


Figure 42. Radio nets in a cavalry reconnaissance troop, mechanized.

the march. When the troop is in a narrow zone or on a combat mission, this net may be used as a troop command net by placing all platoon sets on the same frequency. When used as a command net, the troop service net, because of the short range of its frequency modulated equipment, increases the security factor in radio communication.

(3) *Liaison service net.* This net is designed for short range communication between the troop command element and the liaison detachment. It may be part of the troop service net.

(4) *Common troop net.* The B channel of all SCR–510's and one channel of each SCR–508 or SCR–528 may be tuned to the same frequency as the liaison service net. This permits the use of the common troop channel whenever any portions of the troop are grouped, thus necessitating the netting of SCR–510's from different platoons. A common troop channel is especially valuable when casualties require the reorganization of the troop and time does not permit retuning of sets, or when a team or platoon is reinforcing another platoon on a mission.

c. Messenger and liaison service. The messenger ¼-ton trucks of the reconnaissance troop will be adequate only if their use is properly planned. All field orders of the troop commander must include alternate plans for communication to include the use of messengers. Certain administrative reports such as the unit report, daily telegram, ration return, and morning report should be delivered at one time by a scheduled messenger. The most economical use of messenger communication may be effected by designating relay points on the axes of communication of each platoon to which messages may be sent. The troop command post and the relay points must follow closely behind the platoons, so that the strength of the platoons will not be depleted due to messengers having to travel long distances. The same service may be expected from division to the troop. In the event radio communication becomes ineffective due to enemy jamming or other reasons, it may become necessary to utilize personnel and ¼-ton trucks from the reserve to assure adequate messenger service.

Section II. TACTICAL APPLICATION OF COMMUNICATION

168. GENERAL. The cavalry reconnaissance troop, mechanized, being the sole reconnaissance agency at the disposal of the division commander to do extensive motorized reconnaissance, requires speedy, reliable communication capable of operating under all conditions of distance, weather, terrain, and hazards of war. Information is valueless if it

does not reach the commander in time to be of use to him in formulating his plans.

a. Standing operating procedure. (1) It is essential that the organization of troop communication be simple and thoroughly understood by all concerned. This may be accomplished by a standing operating procedure. All personnel of the troop must be trained in radio telephone procedure, the phonetic alphabet, and microphone technique. The SOP must place limitations on the voice nets in order to assure their use for essential traffic only. All messages must be well thought out and preferably written before being transmitted on voice radio. In messages, quality is more important than quantity. The SOP must provide a plan for handling administrative traffic. The radio operator detailed to keep the situation map, journal, and journal file provides adequate message center service for a reconnaissance troop. The SOP for communication security should include provisions for:

(*a*) Local security at the troop command post.

(*b*) Destruction of signal equipment and records.

(*c*) Use of secret codes, ciphers, or prearranged codes.

(*d*) Measures to overcome the effects of enemy jamming, deception, and traffic analysis.

(2) Lateral liaison between platoons on reconnaissance may be effected by employing the second receiver as a listening station in the FM net of the adjacent platoon.

(3) Formations and battle plays known to all will greatly reduce the volume of radio traffic incident to control, and thus leave the nets free for the transmission of information and orders.

b. Flexibility. The reconnaissance troop will be required to perform a number of varied missions to which it must adapt its communication quickly and effectively. This requires an understanding by all troop personnel of the organization of communication, limitations and capabilities of the available means of communication, and the proper employment of those means. Radio equipment and transportation available within the troop lend themselves well to a flexible communication system which may easily be adapted to any situation. The net organizations, as shown in figure 42 and explained in paragraph 167, provide radio

communication which may be adapted to any combination of teams of platoons at short or long range. An alternate plan for communication must be ready for use at all times in the event radio communication fails or radios are ordered silenced.

c. **Security.** Communication security is the constant concern of all reconnaissance leaders. It is essential that radio operators understand the dangers of giving information to the enemy through faulty operating procedures or techniques. All message writing personnel must appreciate thoroughly the enemy's ability to gain information from radio traffic. Since reconnaissance units seek speed as well as security in their transmissions, both factors must be considered carefully in each situation. In stable situations where the enemy has time to make use of the information he may gain from radio traffic, the reconnaissance leader must employ the most secure means of communication available. In rapidly moving situation where time is of greater importance, security may be sacrificed to speed.

d. **Coordination.** (1) Since the reconnaissance troop, infantry division, exists to provide the division with information essential to the accomplishment of its mission, it is necessary to coordinate communication of the troop with that of the infantry in order to get information to the front line units. This may be accomplished by dispatching messengers, or, if available, liaison agents equipped with radio, direct to the front line infantry units in order to give them detailed information. Infantry commanders may attach elements of their intelligence and reconnaissance platoons to elements of the reconnaissance troop working in their immediate vicinity to insure their prompt receipt of all information gained.

(2) When the reconnaissance troop reconnoiters in zones adjacent to or behind other reconnaissance units, coordination of communication both laterally and from front to rear will be required. The coordination will normally be designated by the higher command, but must be effected by the communication officer or troop commander. Liaison may be accomplished by radio, contact patrols, lateral contact on phase line, or exchange of liaison agents.

169. COMMUNICATION DURING RECONNAISSANCE. The efficient operation of communication on reconnaissance will be assured if all personnel have been trained to make the maximum use of standing operating procedures, hand and arm signals, flag signals, and battle plays to minimize the volume of radio and messenger traffic necessary for the internal control of the platoon and troop. This should be supplemented by very complete field orders, based on a study of the terrain and map, in order that everyone understands exactly what he is to do. The effect will be to reduce the amount of traffic and leave the air free for information of the enemy and terrain. All radio stations must monitor continuously to keep all teams abreast of the situation. When reconnaissance is moving, the available means of communication are limited generally to radio and messenger. When contact is made, reconnaissance will be performed largely by dismounted patrols and observation posts. The reconnaissance troop is authorized a limited supply of wire or telephones. Additional telephone equipment may be made available upon request within the division. This equipment provides a valuable means of transmitting information from outlying observation posts to the relay point. Contact with division command post and other infantry units may be made by tapping in on the nearest infantry wire. When a number of observation posts are in operation, accuracy in observation will be promoted and errors avoided if the observation posts are in radio or wire communication with one another. The SCR–509 is an available means of communication within the troop for use from observation posts or dismounted patrols to relay points. The SCR–536 is available within the division for the same purpose.

170. COMMUNICATION DURING OTHER TACTICAL MISSIONS. The employment of communication of the reconnaissance troop, infantry division, in any tactical mission will be planned by estimating the communication requirements as dictated by the mission, the terrain, and the enemy capabilities for signal counter measures, and by adapting the basic nets, the available personnel, and equipment accordingly.

APPENDIX I.

CIRCULATION LIST

(Attach message here or enter synopsis of telephone message, verbal directive, or complete oral orders.)

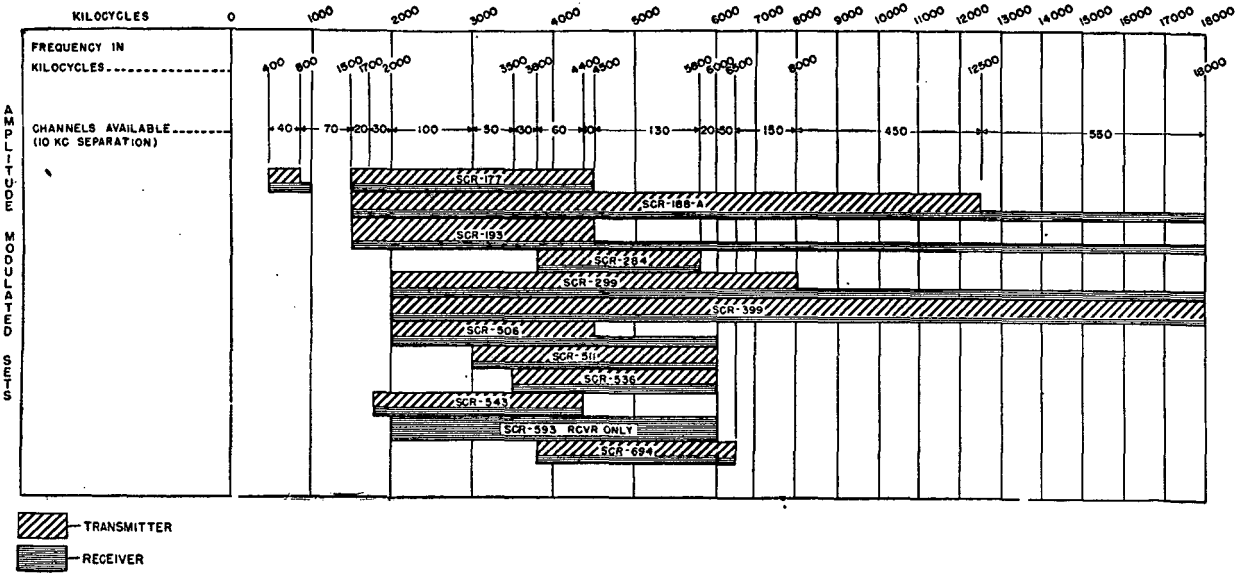
Time message was received at CP.....

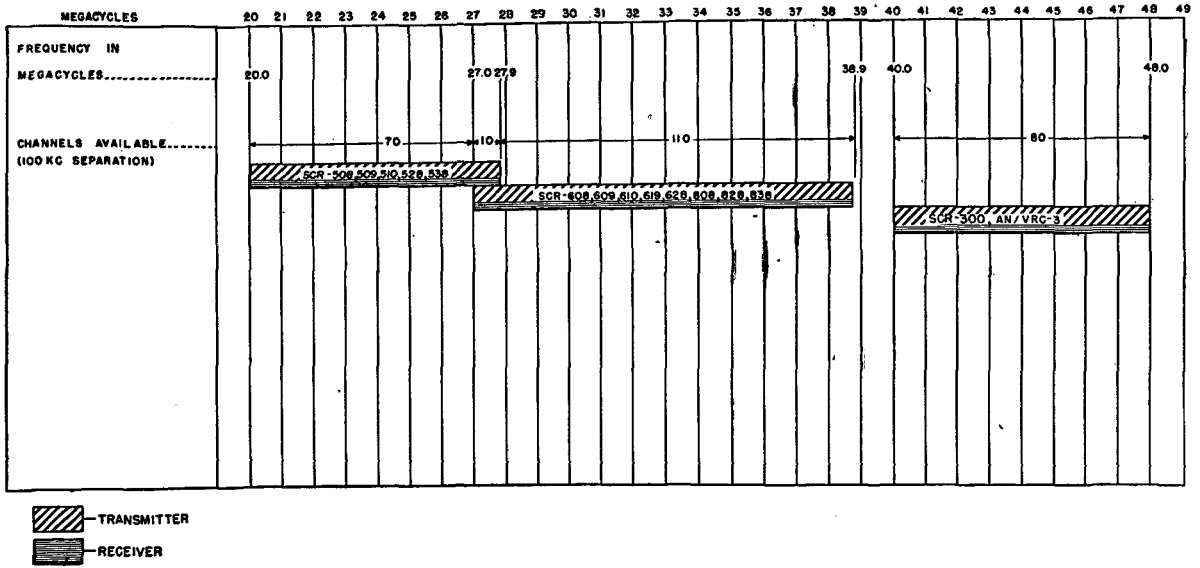
PRIORITY	CIRCULATION	INITIALS	ACTION TAKEN
	CO		
	EX		
	S–1		
	S–2		
	S–3		
	S–4		

Return to S–1 for entry in Unit Journal

APPENDIX II.

Frequency coverage and channel availability of Ground Force Radio Sets.




FREQUENCY MODULATED SETS
MEGACYCLES
20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49
FREQUENCY IN MEGACYCLES
20.0
27.0 27.9
38.9
40.0
48.0
CHANNELS AVAILABLE (100 KC SEPARATION)
70
10
110
80
SCR-508,509,510,528,538
SCR-608,609,610,619,620,628,628,638
SCR-300, AN/VRC-3
TRANSMITTER
RECEIVER

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